

# AVIATION WEEK

JUNE 15, 1953

A MCGRAW-HILL PUBLICATION

50 CENTS

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have fallen prey to Panthers\*...

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# Aviation Week

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Table of Contents on Page 8 46,548 copies of this issue printed

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### Domestic

Cargo-carrying B-47 broke the trans-Atlantic speed record June 5, flying 3,120 mi from Lawrence AFB, Mo., to Farnham, England, in 5 hr 22 min. The record was set on the final flight of a three-day operation involving 45 Stratofortresses of the 306th Western Bombardment Wing from MacDill AFB, Fla., to Britain. Each bomber was heavily loaded with cargo stowed into bomb bays and Kety pods on each side of the fuselage. A 15 plane squadron left MacDill each day, stopping at Lawrence for refueling. The B-47s will fly a 60-day transatlantic mission across Europe with 20 KC-97 wing tankers that accompanied the wing to England. The 306th operates a B-50 wing at Peard, and is expected to be replaced by the 309th Western Bombardment Wing.

Jet cargo transport capable of 390-mph speeds is being developed by Fitch Engine & Airplane Corp., applying research solicitation placed in engineering studies of a high-speed turbine bomber, president Richard S. Scientific research. Development of the first cargo aircraft is described as the primary goal of Fitch's multi-million-dollar research program. Details and development of the jet transports are not disclosed.

**Fair American World Airways' Latin America Division** got final subsidy paid per ton C-46, at 1.75¢ rather than normal 75¢ action on airfreight for Apr. 5, 1948-Dec. 31, 1951. CAB disclosed 35 million of expenses on growth LAD extended operations and equipment so sales. Board plans to set a final contract and future rate in about two months.

New labor agreement has been signed by Transo Aircraft Corp., Dallas, with the United Automobile Workers (UAW), giving wages to a new cost-of-living index. The contract gives out a two-cent wage per hour under the old index for 4,500 Transo employees.

**Rep. Gen. Roy Smith, USAF Director of Public Information**, has been nominated for promotion to major general.

First under trials of the Collins air transport system was started last week by Seneca an scheduled trans-Atlantic DC-6B flights. Collins says the system will reduce the number of

## NEWS DIGEST



**FINDLAGE MOCKUP** of tri-jetprop transport designed by Texas Aircraft Corp., Dallas, for USAF competition was by General Aviation Week Inc., p. 16. Photo of Transo Model 27 shows blend use of seven pods to ease maintenance. Model to be powered by an Armstrong Siddeley Sapphire 5000 turbojet engines.

Model 6 delivering L-1011 day and 27 to about at 100 mph. The craft is designed to seat two cabin-type. Landing gear is retractable truck-type. Two other versions have been planned: a four-engine tri-jetprop type and a four-engine Model 29 powered by an Allison T2000 turbojet engines.

maintainance needed on cockpit panels.

### Financial

Just design purchase of Texas Aircraft Corp.'s two-plane, all-metal T-101A Model 27 has been made under a cost that 31 million contract signed by Chile with the Wright consortium.

**Raymond B. Kinney, Committee Deputized**, Deputy Undersecretary for Transportation, died June 6 at New York.

**Cost Accounting Board** will open hearings June 16 on the final Motor Air Transportation costs at Lambert Field, St. Louis, Mar. 23, for cost in cost.

**Transo Aircraft Corp.** plans to operate a trans-Atlantic air service for Civil, passenger, A-1, & General (Aircraft Week, Apr. 20, p. 8) have new into competition. The Greek Minister of Commerce reports contract for purchase have been received from other Greek financial groups and foreign air lines.

**British Airways** Division, manufacturers of filters for aircraft, automobiles and industrial fields, will build a new plant at Detroit for occupancy in November. Plant will consolidate four facilities Detroit facilities.

**Sixty-Ninth Tactical Reconnaissance Wing**, composed of former Air National Guard units from Oklahoma, Tennessee, and Missouri, is scheduled to leave for duty with NATO forces in Germany. Wing flies RF-105s and RB-26s.

**Law, Inc., Grand Rapids, Mich.**, has declared a regular semi-annual dividend of 12¢ stock on each share of 5% preferred stock. The corporation reports sales totaling \$2.1 million for the first six months of last year, a first compared at 1950; higher than the same period of 1951, totaling in of blue 31 was \$744 million, totaling an all-time high.

**Black Airways** reports a 1952 profit after taxes of \$154,578, derived solely from the sale of a C-46 and a prototype DC-6B. Operations incurred a \$5,799 loss.

### International

**South J-29, Sweden's 650 mph. supersonic jet fighter**, made its public debut June 6 during its test over Black Lake.

**Maj. Gen. Roger Schlegel, Sweden's** no defense chief, was killed June 4 in crash of a training plane with all the aircraft's engine.

**Packard's guided missile** has been equipped by the French defense department, which says the 50-lb., 100-mph. weapon is designed to attack tanks, can be launched by a fast soldier.

**Unofficial speed record** was set by a British Canberra jet bomber June 6, flying 2,250 mi from Winton, England, to Gander, Newfoundland, in a record of 516 mph.



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## The Aviation Week

June 15, 1953

### Headline News

AF Gathes Book for Canyon Flight	12
Wilson Orders B&B Ford Clash	14
Kennedy Traps Under Fire	15
Lester Lays Air Force Open in Senate	16
Wayland Waives Route Air Defense	17
City Ford for Better Airport	18
Indiana Defends Thunderbolt Fate	19
Confirms American Point Reversion	20
New Short Hauler for USAF	22

### Aeronautical Engineering

New Goal in Center Ground Wing	23
Details of Tailfinless Test Center	24
Aircraft Shows MG Elimination	25

### Production

Why Designers Use Mass Production	26
-----------------------------------	----

### Aviation

Plane vs. Missile Reliability	27
-------------------------------	----

### Equipment

AF Fuel Controls Tested Chamber	28
Engine Develops New Indicator	29

### Air Transport

CAB Announces New Ferry Study	29
North American Fights for East Coast	30
Continental Fins J&B Ferry Action	31
Ford Low Starts Safety Reinforcement	32

### Editorial

Air Power Is Indispensable	33
----------------------------	----

### Departments

News Digest	34
Washington Roundup	35
What's Where	36
Industry Observer	37
What's New	38
News & Drug	39
Letters	40
Food Watchdog	41
USAF Contract	42
Fiber Center	43
OS for Logo	44
New Aviation Products	45
Also on the Market	46
Plans for Flying	47
CAB Gathers	48
CAB's Calendar	49
Shedding	50
Grinning Galleys	51

### Picture Credits

1—Shore Aircraft Corp. 13—Walt Whitely 15—USAF 16—Walt Whitely 17—USAF 18—Walt Whitely 19—USAF 20—Walt Whitely 21—USAF 22—Walt Whitely 23—Walt Whitely 24—Walt Whitely 25—Walt Whitely 26—Walt Whitely 27—Walt Whitely 28—Walt Whitely 29—Walt Whitely 30—Walt Whitely 31—Walt Whitely 32—Walt Whitely 33—Walt Whitely 34—Walt Whitely 35—Walt Whitely 36—Walt Whitely 37—Walt Whitely 38—Walt Whitely 39—Walt Whitely 40—Walt Whitely 41—Walt Whitely 42—Walt Whitely 43—Walt Whitely 44—Walt Whitely 45—Walt Whitely 46—Walt Whitely 47—Walt Whitely 48—Walt Whitely 49—Walt Whitely 50—Walt Whitely 51—Walt Whitely
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## Washington Roundup

### Slippage Penalties

Neither the aircraft industry nor Pentagon have lost any sleep over yet on how Defense Secretary Charles E. Wilson intends to enforce the penalty for aircraft production slippages with which he threatened manufacturers at his recent Pentagon conference (Aviation Week June 5, p. 13).

Most prevalent industry reaction is that Wilson was just "baiting on the side" for the record and actually has no serious intention of dropping aircraft not delivered on time from the production program. If he did, it would result in greatly reduced aircraft deliveries over the next few years and heavy financial losses for most manufacturers with large production programs.

### Helicopter Cut

Budget beating the fast-growing helicopter industry but, in the current budget shuffle was in the chosen line of five USAF small helicopter squadrons programmed for Fiscal 1953 and Fiscal 1954 only. The USAF capital squadrons would have been assigned to the Troop Carrier Command. In contrast, Army's helicopter program wasn't touched. Army's USAF capital squadrons represent degradation of the Army's program for its own transport troops squadrons operating under divisional control.

### New CAA Siberio?

Washington observers wonder if the Civil Aeronautics Administration regional office in Kansas City is biding its time for the role of high-speed aircraft of the continental Office of Aeronautics Safety.

Latter to go to Kansas City is Oscar Welles, who was acting chief of aircraft engineering at OAS of "Whitely" last. Some of Welles' referrals on aircraft safety matters stirred major news that had to be aerial safety by CAA administrator Fred Lee overseas. Welles.

Bringing Welles of Kansas City is William B. Dorn, formerly deputy director of OAS. Still in Washington is Ernest Hentley, head of OAS.

### Super Carrier Issue

Watch for the Navy super carrier issue to pop into the present defense budget row. Departmental studies plan to give Defense Secretary Wilson on how funds for the second and third super carriers got into the Navy budget and whether the Joint Chiefs of Staff ever approved these additional carriers.

Pentagon consultant says JCS approved only the first super carrier and Navy is turning the other two from being stripped from contractors of non-advance sale. Anti-advance sale is the Navy's primary mission under present JCS rule and intense arguments.

### Heavy Press Cuts

After being reported in the Republican Administration's first survey of military construction, the USAF heavy press program in being heavy going in the current defense economy drive. No decision has been made yet, but indications are some parts of the program will be eliminated or postponed—probably the largest.

33,000-ton presses. Despite the high original cost of the heavy press program, it eventually was expected to effect major economies in both time and labor on high-speed aircraft production.

### Airmail Boom

Boom in airmail volume and cost in some cities was moving faster five weeks in the Post Office legal department reported on how the Postmaster General might cut legal aid type preventing shipment of airmail and by airmail. This has been a major project of Assistant Postmaster General Transportation John Allen and executive director of the Transportation Bureau Alfred G. Loe.

The approval prohibition against shipping surface mail (cost savings) by air is a Postal Bureau Act clause stating that Post Office shall charge 5 cents per ounce of airmail. Allen and Galloway now believe there are more legal reasons why they can ship surface mail by air at less than 5 cents than there are legal obstacles. When they start dropping some regular mail at 10-15 cents a ton-mile, cuts in through airmail competition (now 45-55 cents a ton-mile) may not be far behind.

### McNeil's Role

Assistant Defense Secretary Wilfred McNeil, already given much credit for being the guiding hand in the drafting of the new Administration's defense budget which slashed \$1 billion from Air Force funds, is now being given much credit for giving its course to Capitol Hill. The major Stanley Bennett, formerly a right-hand man to McNeil is now right-hand man to Sen. Eugene Ferguson, chairman of the Senate Military Appropriations Subcommittee. Bennett writes the questions, hands them to Ferguson, Ferguson asks them.

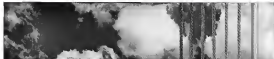
### Plane Buying Nosedives

Air Force procurement of aircraft and related material has taken a nosedive since the new Administration took over. During the first six months of fiscal 1953—July through December—USAF obligations, affecting contracts let, averaged \$1.2 billion a month. But for the January through April period, the average was down to \$260 million a month.

Naval obligations, which got off to a slow start last July, has gone up sharply. Over the July-December period, Navy obligations for aircraft and related procurement averaged only \$251 million a month. But for the January-April period, this went up to a \$775-million-month average.

### What About GFP?

One of the big problems about slippage in military aircraft schedules has always been loading military schools for Government-Provided Procurement in connection with the schedule of the aircraft themselves. If Defense Secretary Charles E. Wilson's reported conditions on Government-Provided Procurement are effective, he will need to get the GFP used on the bill, too. Otherwise the aircraft backlog will end up with airplanes as complete as he can make them, but still lacking some essential items. —Washington staff



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## WHO'S WHERE

### In the Front Office

Thomas Wells has been elected local chairman of *Aviation Observer* Corp., Box 100, CMC, according to Arthur G. Samuel, who manages R. H. Hunsicker's PACC, new trustee and assistant to the treasurer.

K. W. Johnson, former chief engineer of the mechanical systems company and services laboratories, Wright Air Development Center, Dayton, is president and chief engineer of the newly formed K. W. Johnson & Co., also at Dayton, which will operate as chief and technical systems.

Major Gus Edmund H. Lantry (USA Ret.) has been named president of Federal Telecommunications Laboratories, Inc., New York, N. Y.

J. H. New, chairman of General Controls Co., Glendale, Calif., has been elected to the board of directors.

### Changes

John W. Young has been named quality control director at North American Aviation, Los Angeles, succeeding the late R. E. Davis. Fred L. Bradley has been appointed chief conceptual engineer.

Belle Weiss is now assistant plant controller for Schaeffler Co., San Diego. Also promoted: Fred S. Steg, Jr., chief cost and administrator; Don Moorehead, Hulse Locks, assistant production agent; Wayne Swanson, material control supervisor; and Homer Bille, assistant supervisor of material control.

Paul G. Chalk has been appointed manager of physical education at JAC & Hyatt, Inc., Cleveland. Also promoted: Frank A. Hagg, sales manager-commercial products; and Leonard L. Brubaker, manager of commercial major sales.

R. Mervyn Sargent has been named chief systems engineer at a subsidiary of an office, Wichita Division.

C. R. Yoness has been promoted to chief test planner at General Aircraft Corp., Alton, and R. W. Sargent has been named to handle all light aircraft test and planning.

G. S. Halsey has been named chief designer of the helicopter division, Percy Aviation Co., Los Angeles.

Samuel G. James, has been named district manager of Hunsicker Corp.'s Aircraft and Special Products Div., Tulsa, Okla., Tulsa.

### Honors and Elections

Don E. Belfus, president of Francis Ball Corp., Memphis, Tenn., has been awarded an honorary Doctor of Engineering by Purdue University, where he was graduated in 1912 as a mechanical engineer. Frank N. Pendergast, board chairman, has received an honorary Doctor of Science degree from Pennsylvania Military College, Canton. Fred D. Edwards, chief of the latest radio project, was named chairman of the University of Texas Plan by a recent Plan for honor of domestic and international relations.

## INDUSTRY OBSERVER

►Pan American World Airways still is negotiating for a lease of the de Havilland Comet 2 prototype from British Overseas Airways Corp. as soon as BOAC puts its last production models, especially due at the end of this year. However, the Comet 2 program may be set back, partly as a result of the Comet 1 crash. The Comet 2 prototype has just completed one set of tropical tests but may have to undergo another before certification.

►Allison Division, General Motors Corp., is set again to go ahead with the Model 513-C-1 turboprop, 1,578-hp thrust conversion of the T35 turboprop engine, unless it has some definite assurance of viable orders for the powerplant—presumably for military use. The converted T35 was one of the engines figuring in the TX engine competition, and some military orders of the French-designed Morane engine, with which Comau was the competitor, still are making the Allison powerplant on grounds it is more powerful and would be easier to build before the Morane. Continental Motors Corp. will build the Morane in that country.

►Covault Aeronautical Laboratories, Bellville, N. Y., is conducting a research study on a new altitude testing rig for small airplanes, aiming to relieve the disadvantages of both the triple and the slider wheel loading rigs, and eliminating major disadvantages of both.

►An Aeroflot working of a proposed system for location and situation of foreign airports, Canada is being studied by USAF and Navy experts, with industry participation. The study looks a greater standardization of controls than has been available heretofore, with greater ease of transition by pilots from one airport to another.

►Boeing Pacific Division is exploring the use of a new four-page tele-reporting system to aid Navy pilots in visual landings on carriers. The airborne device would transmit to a shore indicator on the carrier, be used by the landing signal officer's assistants, who would receive the following critical information on final approach, speed, engine rpm, and rate of change of speed and rpm. Underneath the ship, the U. S. Navy is a card for the ship, so Boeing is discussing it with Canada for use as a new Canadian carrier.

►Boeing is using Col. Robert McCormick in the market for a replacement of the Vickers Viscount as a transport plane. In a British unit assembly, the Chicago Tribune publishes looked at the smaller prototype Model 510 owned by the British Ministry of Supply and thought it might do. But this particular airplane isn't on the market, so he would have to settle for a production Viscount.

►Leading edge members of the wing of the de Havilland Comet 3 has been altered from earlier Comets. The leading edge dips down, to get somewhat the same effect as with a drop-nosed leading edge. de Havilland expects the new model will improve the jet transport's lateral performance without sacrifice in cruising speed.

►General Electric is outfitting a Navy Douglas Skyhawk F3D with a new experimental intercepter for control system at GEC's Schaumburg flight test center. The new system provides "closed loop" guidance with the radar-compass signals being fed directly to the intercepter in order to maneuver the plane into the correct intercept position automatically.

►USAF's Directorate of Flight Safety Research has made a series of design recommendations to the U.S. industry for landing gear, based on a study of Air Force accidents involving gear malfunctions. Recommendations include: Forward extension of gear, so that failure will help gear get down to locked position in the event of malfunctions; simple locks with non-critical adjustments; fast and simple emergency release; visual indication of locked position; adequate tire protection.

# AVIATION WEEK

## AF Cutback Heads for Fight in Congress

VOL. 38, NO. 24

JUNE 15, 1955

- Vandenberg challenges 143-wing stretchout.
- Wilson asks breathing spell to re-evaluate needs.

By Katherine Johannes

Outgoing Air Force Chief of Staff Gen. Hoyt Vandenberg's ambitious challenge of the new Administration's plan to close down and stretch out the "one shot" 143-wing USAF program threw the issue into the public arena.

It probably will be debated hotly up to the November 1954 elections, and the first showdown coming in the form of Congress in votes on the revised Administration defense budget which slashed \$5 billion off USAF funds for the coming fiscal year.

"You don't mean that the whole 143-wing Air Force would be shown in availability at the outbreak of a war?" Sen. Homer Ferguson, chairman of the Senate Appropriations Subcommittee, asked abruptly.

"The 143-wing program has no provision for a reserve force," Vandenberg replied. "If once we would have to use it all at once, it is a one-shot Air Force."

• **140 Wings.**—The 1955 defense budget, aimed at reduction of 137 wings by mid-1955 and 143 wings by mid-1956, provided \$11.7 billion for USAF, covering 56.4 billion for aircraft and related procurement and \$13.5 billion for aircraft and development. "The new Air Administration's budget shoots at 120 wing strength by mid-1955 and 110 wing strength at this level to mid-1956. It will slash procurement funds by \$1.1 billion and research and development funds by \$65 million."

The 120-wing reduction in the new program, Vandenberg said, would include five fewer strategic jet wings, 15 fewer tactical wings and fewer jet subsonic wings. An defense is really affected, he said, because tactical wings based in this country are used in defense enterprises.

Concerning that "I sense from some statements of the military leaders the desire to build up such forces as would defend the whole world," Secretary of Defense Charles Wilson appeared before the committee to meet Vandenberg's challenge.

• **Low Estimates.**—Ferguson said that the new Administration wants a complete



VANDENBERG: One shot Air Force.

review of the entire military program, Wilson emphasized that the President and the National Security Council have "finally realized we are not safe."

He anticipated that the review would be completed in November. If the decision is made to go forward with the 143-wing program, he said, the review "will extend no date." Wilson stated that he had urged previous all the money that USAF could prudently spend in fiscal 1954 and is based on a policy of "security first and economy second." He mentioned that "a little less peace continues" by Air Force "would help."

• **Air Force View.**—The heart of the Wilson-Vandenberg controversy appeared to be whether there should be a "breathing spell" to re-evaluate the 143-wing program, particularly in view of current developments. Opposing the move, Vandenberg was emphatic on these points:

### Aircraft Schedules

The aircraft industry has been operating under Military Production Schedule A-19, approved in October 1953. A new schedule is easily has been approved by the Defense Department and will become effective July 1, 1953. That schedule calls for delivery of the same number of aircraft scheduled for fiscal 1954 under A-19, plus 75 additional combat aircraft expected to be picked up from slippage in fiscal 1953 deliveries.



WILSON: Security before economy.

• **No air bases.**—He entered the situation to close the October 1951 decision of the Joint Chiefs of Staff to build up to a 143-wing air strength as quickly as possible, which was based on "the best available intelligence" that by mid-1954 the Soviet Union would be able to launch an all-out atomic attack against the U.S.

Vandenberg stated "The size and composition of the proposed force was based on an examination of all factors such as the buildup of our own atomic stockpile, the improvements to be expected in our own weapons and in the enemy's weapons, and the expected nature and disposition of possible enemy forces. These have been no significant or unexpected changes in weapons development or in forces since the decision was made."

• **Increased atomic firepower.**—He did not want any reduction in the number of planes in the 143-wing force. He stated that it would take the same plane inventory to deliver an atomic attack as an attack with conventional planes.

Under present questioning by Sen. Edward Tamm, Vandenberg claimed that "over the target" it would take only two planes with atomic bombs to knock out Kelly Field and Randolph Field in Texas, but it would take 30 planes with conventional firepower. He pointed out that he would only two planes—two bombers and a weather plane—were required for the Nagasaki and Hiroshima missions. They also observed that because of its greater effectiveness an atomic attack would not have to be

followed up by "wave after wave" of plane formations to accomplish a mission as in World War II.

• **Personal One-Step.**—He was sympathetic to the abandonment of the 143-wing goal—at least industrial abandonment—Vandenberg directed his attack on the Wilson regime primarily at personal and basic constructive policies.

Although USAF is expanding, he pointed out, it has been directed to reduce personnel over the coming years from a current strength of 970,000 to 870,000. That will mean that pilot training will have to be held at 7,200 a year, instead of rising to 12,000 a year, he said.

More constructive, directly a "national industrial" in the 143-wing program, was held up by Wilson's requirement of a review of all projects, he pointed out, more than \$100 million appropriated for construction has not yet been received.

Vandenberg reiterated that "there has been a heavy industrial burden that has been used for aircraft and for development of planes and weapons of the future."

He did not directly challenge the \$1.5-billion deficit in procurement money. He did point out that "to have a jet bomber in 1956 we have to make a contract for it in 1953 or 1954," and delivered USAF's \$2.5 billion carry-over of unexpended procurement funds—a chief target of Wilson's—by stating that \$2.5 billion accounts for actual contracts and the remaining \$1.5 billion accounts for funds not yet expended and planned and programmed.

• **Talbot View.**—USAF Secretary Harold Talbot defended the Wilson budget, but made questioning and that "some additional money could be spent" to push the air program in fiscal 1954, but that "no additional obligations authority for planes would be required."

• **Wilson Comments.**—There are points made by Wilson in rebutting Vandenberg:

• **Under the Administration program,** most planes will be ordered to be laid up in National Guard and Reserve bases. "The condition and effectiveness of these forces must be considered in its latest appraisal of the air power question." Wilson stressed, "and we will be approximately 143 wings of Air Force combat strength under the new program by June 1955—128 in the regular Air Force and 15 in the National Guard and Reserve." (Vandenberg, however, said that National Guard and Reserve are "second class units" and could not be counted on for prompt military action.)

• **The money of USAF's** big program will cause "how-to-the-schedule delay"

### Talbot Confirms Plane Cutbacks

USAF Secretary Harold E. Talbot last week confirmed in Capitol Hill production cuts as their aircraft program previously reported by Aviation Week. They are:

- **Bomb.**—T-144 bi-engine fighter (Aviation Week May 30, p. 12 and June 6, p. 13). Talbot said this program had been eliminated "because requirements for which it was designed are to be handled by other aircraft." Congress, Ltd. of March 1954 was scheduled for second-source production of the T-144.
- **Chase.**—C-128B transport (Aviation Week May 30, p. 12 and June 6, p. 13). Talbot said this program had been reduced because

- "production delays and other considerations."
- **Bomb.**—B-47 Strikemaster bomber (Aviation Week April 18, p. 13 and June 6, p. 13). Avian's first priority that a cut in the B-47 was being considered by Defense Secretary Wilson not asked officially. Talbot admitted last week before the Senate Appropriations Committee that 250-B-47's would be cut, especially in the event that they were "in excess" to be used by Strategic Air Command in training atomic bomber combat units. The B-47 cut will come from production schedules of Lockheed Martin and Douglas Tech plants.

### Aircraft Spending

Defense Secretary Wilson testified that original USAF estimates for spending on aircraft procurement totaled \$51,579,000 for fiscal 1955 and \$9,907,300,000 for fiscal 1956.

Actually, USAF was able to spend only \$50.5 billion in fiscal 1954 for aircraft and it is estimated that between \$6.15 billion and \$6.7 billion actually will be spent in fiscal 1954.

Wilson testified that production slippages of 12% in combat aircraft and 17% in all types of aircraft accounted for the \$5.5-billion difference between what USAF had appropriated for aircraft procurement and what it actually will be able to spend before the end of fiscal 1954.

"To not do so on worthwhile projects," he said, added, "pure" research is not a proper activity of the Defense Department and completed acquisition of "large orders" to build up (what is the country) a contract.

• **Acute Reduction.**—The estimate in Congress on USAF's coming year budget largely based on Vandenberg's revised requirements for estimates, all cut—probably about \$3.5 billion of the \$5.1-billion slack made by Wilson, which members of the Senate Appropriations Committee have requested. The committee expects to call Wilson back to state Vandenberg's strategy and justification.

Special interest centers on the aircraft and development program, and Wilson has been asked to appear in closed session to report on the "dis-



# UN Air Bases in Korea Open to Attack

(Editor's note: Consistent clearance of the following dispatch on lack of air base involvement at the Far East Air Force base, recently provided last week's comic developments in Korea, trace talks Gen. Otto P. Weyland's comment, an advisory column, on the need for additional anti-aircraft units at the Far East with experience to Commanders Gough's report on the way in which bases be open to reckless attack.)

By William J. Gough

Seoul, Korea—U S air bases in Korea are now open to attack from a Chinese Communist air force of more than 1,500 planes, mainly jets, based just north of the Yalu River. Despite the constant threat, these bases lack adequate anti-aircraft protection.

Fifth Air Force and Eighth Army have asked repeatedly for sufficient anti-aircraft artillery without success. This could be as big a scandal in the armament shortage. If one thing is true it is more than an assumption, it is plain fact. Many Air Force officers believe U S air bases in Korea are endangered seriously by the shortage.

• **Vulnerable to Attack**—"I would like to have additional anti-aircraft units," Gen. O. P. Weyland, commanding general of Far East Air Force, at a recent Aviation Week in an exclusive interview. "If the enemy should attempt a large-scale effort against UN air bases, the vulnerability of anti-aircraft units would be exposed in an adequate protection."

Situations is made worse by these facts:

- **Primary defense against enemy air attack is, of course, U S air power.** But Fifth AF does not have sufficient fighter interceptors to stop a full-scale Communist air attack.
- **U S air is vulnerable.**
- **Enemy air attack could catch U S jets even off balance.**

This means anti-aircraft artillery positions are doubly important.

• **Proved Defense Situation** has been so desperate in the combat zone that Fifth Air Force and Eighth Army officials must periodically to determine procedures by which limited anti-aircraft strength is stretched out to U S installations in Korea.

It can now be proved that during the early part of the war, there was no U S anti-aircraft artillery whatever in Korea. The situation has remained unchanged but still a matter. At the end of 1952, after two and a half years of war, less than half of the top priority defense units in Korea had anti-aircraft positions.

Thus, a number of important U S air bases were among vital installations totally without anti-air defense.

One directly on the shipping route. The need for additional AAA units is paramount. Due to the enemy's present and potential capabilities for launching a major air offensive, it is considered absolutely essential that our vital bases and installations have a minimum effective AAA defense."

But such efforts brought little action. This is an irony contrast to North Korea where quality and quantity of Red attack have been increasing rapidly.

• **Targeted Airfield**—What is the explanation for a policy which has left U S Air Force in Korea in such a vulnerable position that some of its key leaders claim it could be driven from Korea? One of Communists' decided to use them as pawns? One high officer at Fifth Air Force headquarters estimates it could be used as a "bait" for "work" by such a small force. Gen. Weyland is less pessimistic but admits: "If the MIGs came down in force, they would achieve some initial success."

Military clearance has place at least partial blame for the situation on the high-level attitude uncovered by the Senate Armed Services Subcommittee during the examination report in Washington. Their investigation brought to light a doctrine issued by Secretary of Defense George C. Marshall on Sept. 27, 1950, which ordered the armed services to assume as showing an honest estimate that the war would be over by June 30, 1951.

(Gen. Marshall could be asked upon the recommendation of the Joint Chiefs of Staff and there were those who thought the House would have had a word in the affair. Sen. Harry F. Byrd has called the doctrine actually a "slovenly error" on military preparation terms.)

The attitude was reflected in the Korean fighting. Visible effects of it is reluctance to spend money for interceptors, fighters and guns which policy planners felt would not be needed as we were today in Korea.

• **"Calculated Risk"**—Disposal of air craft is not positive control by each

conditions. One Air Force general on Weyland's staff explained current thinking on disposition this way:

- **Cost of money attack.**
- **Cost of disposition** in terms of lost effective air power and money.

Under conditions in Korea, Air Force leaders are convinced that loss of air offensive is point, use its money.

"They [the Reds] can blast us overnight," the general admitted loudly. "If they do, then we get the blame for getting our money spent on the wrong side of the money line to call a 'calculated risk.'"

• **Offensive Defense**—But enemy air attack would not end Fifth Air Force entirely exposed.

"Consequently," Gen. Marcus from a meeting of Fifth AF only on a question and tells it to move immediately to an alternate field in a "safe" area, says Gen. Weyland. "It appears the establishment of any in bases from which enemy offensive air operations could be supported by attacking fighters."

By the same token, within the permissible area of operations, we have earned the war to the enemy in his own backyard. The Communists, frankly, have not seen fit to try to bring the war to our backyard.

"Fighter controls, in conjunction with a cable control system, can protect the enemy before he reaches the AAA (anti-air) units, and, therefore, is the most effective means of active defense as long as we enjoy air superiority."

In spite of our past and current conditions, the fields in the Atlantic, Pacific, and Indian Oceans—plus two other Marine Corps bases close to the border, Fungching East and Taipei, and possibly Seoul just south of the Yalu. Enemy aircraft could move in through one of these fields under cover of darkness from a major Marine base and launch a surprise attack against South Korea.

• **Primary target would be U S fighter bases, with priority at Fifth Air Force and Eighth Army headquarters in a secondary objective.** Ongoing enemy air and aircraft action near the coast probably would be hit early in the attack, and afterwards might be made to jam U S transport in Korea.

• **First wave of the Red jet strike would consist of many hundreds of MIG-15s sweeping across U S fighter bases in attack. MIGs, to conserve fuel, probably would fly directly into the Airfield fields, coming in high, riding radar detection.**

• **Initial mission could be staged from**

## Weyland Weighs Air Defense of Korea

Tokyo—Gen. Otto P. Weyland, commander-in-chief of the Far East Air Force, noted the following statement on the need for anti-aircraft units at the Far East Air Force.

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action in keeping the enemy air away from our locally air bases and other establishments. I would like to have more anti-aircraft units. If the enemy should attempt a large-scale effort against UN air bases, the vulnerability of anti-aircraft units would be exposed in an adequate protection."

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avoidable to provide as cover almost continuously for such a shift.

• **U S. Consistency**—U S. value situation might pick up the apprehending air attack and find the shift in the air and the ground. In Seoul, attempts would be made to assemble F-86s and F-84s to meet the attack, but due to high speed of the approaching jet aircraft, it is unlikely even that a few Sabers standing on ship deck at dawn would get off the ground before the Reds hit.

Under present conditions in Korea, 15 minutes would hardly be sufficient to meet a major Communist air raid. U S. air and ground forces have been with the unshakable threat of Red air attack for as long, they possibly would be ready to meet it.

One serious problem from air attack is bound to engender conspiracy and confusion in the ground," Gen. Weyland said.

• **Ballistic Missile**—Reds have the ability to launch the attack. Against this potential effort, until late months ago, Fifth Air Force could put up only two waves of fighter fighter interception, less than 100 F-86 Sabers per wave. Because of their superior performance in the limited MIG-Ally in battle, the Sabers would be handicapped by such great numbers of MIGs even if the superiority of the F-86 could get them.

It has been estimated that a surprise attack might knock out half of the Sabers while they were on the ground.

• **Seoul's Balance**—Air Force recently revealed that at least one Communist wing in Korea now has been equipped with Sabers jets. Fifth Air Force thus increases its fighter day fighter strength without increasing the number of units in action.

If the new F-86 Thunderbolt replaces F-86s now in action in fighter-bomber work AF would have another asset at least partially capable of holding its own with the MIG.

Thus, under Communist air strength in Manchuria appears to be leveling off. Fifth AF could look forward to a smaller military balance with the Reds and more air strength.

Arrival of new Navy fighters also might help the situation.

• **Remainable Capability**—Gen. Weyland, with his eyes sharpened by arrival of the additional 75 Sabers, is not unduly concerned over the possibility of a major Red air attack and believes his fighters provide reasonable defensive capability.

In Tokyo, Weyland emphasized the situation was not as serious as it seems.

"If the MIGs came down in force, they would achieve some initial success, but if they continued to attack it would be a matter of time before the Sabers would shoot them down in the air."

side to smother Fifth Air Force from Japan, but we could. We also could draw from Okinawa and the states.

McGuire didn't have the time to report losses beyond Seoul and some advanced air bases. Popular-driven and jet bombers could go almost anywhere in South Korea, but without McGuire to cover them, Air Force fighters we have could handle it."

► **Red Guerrilla Lookouts**—Front conditions in South Korea are no secret to the Communists. Guerrillas are active in the vicinity of U. S. airfields.

B-26 pilots flying from a base in Southwest Korea, far behind the front, report they occasionally receive more hostile damage from guerrilla activities than they do from Communist fighters north of the front line. Ambushes along roads near American bases are not infrequent.

Radio-equipped Red guerrillas had been in talks confining U. S. air bases to coastal stretches of each coast's area, number and type of aircraft, location of radar sites and movement of reconnaissance units.

► **Unskilled Gun-Whys** South Korea first vulnerable, why haven't the Communists used the air power based north of the Yalu? Why haven't the MIG-15s, IL-28s, TU-16s come south in an attempt to draw Fifth Air Force from Korea?

One of the most authoritative guesses—and one answer is at best a guess—comes from a high Air Force officer in Tokyo with many months of service in the Far East, who believes the Reds are looking back for one or all of three reasons.

► **It would** expose the fact that a great number of Americans are lying in the air war. One Red pilot shot down at sea was stuffed by his own comrades before approaching U. S. forces early could reach him, presumably because he was a Roman.

► **Russians do not** trust Chinese out from under their thumb, are reluctant to allow them to commit the Russians; but Chinese are keen for the south.

► **Chinese are afraid** U. S. will use the Chinese beach against Manchuria in retaliation.

► **Communists, like** U. S., do not wish to expend the war in the Far East, which a full-scale air assault against South Korea would do. It's a good bet, the officer believes, that if the Reds understood their air power, U. S. would lift the Yalu River restriction.

But if such a Communist air attack did occur, it would fail, the U. S. says after three years of war, by far from easy.

"We have asked for more AAA than we've gotten but this has never been a problem because we've never been attacked," stated Gen. Wickham. "It could be a problem."



CRASH BARRIER FOR AF JETS

To keep search from ending at the end of the runway on landing or when they fail to become airborne an ideal Air Force has modified crash barriers. In the one pictured above, at two bases in Korea, this device is a portable device such as a barrier being used in Japan. From try to become an F-104A before jet fighters head into the

house at approximately 240 mph, it now just flies over through the cables set, triggering an warning cable, which in that photo suggests the same looking out. At the bottom, the cable is stretched out and begins to drop heavy chains stretching along the sides of the runway, along the left side. The net costs approximately \$140,000.

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## Aviation Week Picture Brief



**FRONT VIEW** shows outside appearance of counterbalanced door of new "alert hangar" developed for USAF fighters by Lusa.

### New Alert Hangar for USAF

Latest of the growing group of "alert hangars" developed for the Air Force is the one built by Lusa Engineering Co., Bethlehem, Pa. The electrically operated five-ton door can be opened in 30 seconds or less, allowing a jet interceptor to become airborne in less than two minutes, according to the firm. In case of power failure, a hand crank (not seen) is right as picture below) can open the counterbalanced door in about a minute and one-half. Air Force says that three of the seven-one built by Lusa

had two built by other contractors from parts supplied by Lusa. The retail design ordered by USAF contains four side-by-side sections or compartments, each for one interceptor and a control room in the center with briefing and study rooms. The fighter compartments each have two doors, one front and one rear. Framework of the alert hangars is steel, walls, doors and roof can be aluminum, steel, aluminum or poly for as desired. Complete unit is put up in about six weeks.



**REAR VIEW** of counterbalanced door exposes rack and pinion arrangement (right) that can open the five-ton door in half a minute.

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**FTB-3185** AS stand in meeting aircraft engines and is available. Capacity 200-230 volts, 40 cycles, 3 phase AC power to 28 volts DC with rated current of 150 amps. Breaks into sections. In case of overload or short circuit, the circuit breaker will trip. Should the fan fail, the selenium rectifier will start to heat and thermal circuit will open and stop engine heating. 100% duty cycle which operates, usually in 200 Hz. Also in sizes rated to 400 amps.

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**FTB-3135-AS**  
AC Input: 110 to 210 volts, 24 to 400 cycles, 3 phase.  
DC Output: 21 to 28 volts, 21 to 230 amps, 40 cycles, 3 phase.



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**DRIVE MOTORS & BLOWER MOTORS**

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**AIRCRAFT ACTUATORS**

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**JOHN OSTER MANUFACTURING COMPANY**  
AIRCRAFT DIVISION  
BROOKLYN, NEW YORK

G. H. Laid, Inc., 123 Webster St., Boston 2, Ohio

Micro ball bearings in 137 models, in bore sizes from .015 to 6 in. and outside diameters from .010 to 5 in., are covered in a catalog available from New Hampshire Ball Bearings, Inc., Portsmouth 3 N. H. Use letterhead.

Homemade solid state for electronic applications are detailed in Bulletin GEA 5729A being distributed by General Electric, Schenectady 2, N. Y. Notes are designed to meet provisions of MIL-R-6110 and performance requirements of MIL-R 5777B.

Teflon gear caps, used in backing up O-ring seals to hydraulic and pneumatic systems, especially at high temperatures, are described in four-page bulletin available from Resinetics Corp., Belleville 3, N. J. Data is also given on Fluorocarbon rod, sheet and tube stock produced by the firm from Teflon powder.

Transcendence altitude chamber, capable of simulating conditions from sea level to approximately 80,000 ft., temperatures from -100° to 200° and bomb loads from 20 to 90%, are covered in four-page bulletin being sent by Transair Engineering, Inc., 26 Avenue B, Newark 3, N. J.

Standard permanent magnets, available in Alnico 2, 3 and 5 for use in prototype experimental working models of devices for miniature production runs or standard applications, are listed in Catalog 1352 available from Therman & Skinner Steel Products Co., Inc., 1151 E. 24th St., Indianapolis 5, Ind.

### Publications Received

- **Flight Engineering Manual**, by Charles A. Ziem, published by Van Nostrand Reinhold, North Hollywood, Calif. 91601. Second edition of flight engineering guide. This has completely updated and revised to include recent developments in aircraft, instruments, powerplants, and standard flight engineering practices.
- **The Aircraft Compendium** as Commercial Air Transportation, by Dr. M. S. Kinnings, published by Macmillan-Nelson N. Y., 9 LaSalle Boulevard, The Bronx, New York, 10460. A study which may prove to be an important contribution toward conclusion of a cooperative grouping, the result is considered a logical step in keeping with its responsibilities.
- **The High Speed Internal Combustion Engine**, by Dr. Harry R. Ross, LL.D., F.R.S., published by McGraw-Hill, New York and Glasgow, distributed in U.S. by Macmillan, 1206 Macmillan Blvd., Eastford, Conn., 06424, \$11.95. Section on turbochargers and its effect on internal combustion engineering.



Ask the men with  
the most experience...

## Ted Pavell

Chief Pilot, Allied Stores Corp., New York City

"After 19 years of flying, I guess I know the importance of consistent quality in aviation products," says Mr. Pavell, who's logged 6,000 hours. "I've seen how it pays off in terms of both dependable performance and money-saving maintenance."

"Our EDC-3s have flown extensively throughout the United States, Canada, Mexico and the West Indies. Use of all flying conditions, we've found we can put complete trust in Gulf dependability."

"That's been our pleasant experience with Gulf Aviation Products for the last six years."

Chief Pilot Pavell at the controls of the EDC-3 owned by Allied Stores Corp., operations of which feature dependability throughout the nation.



New—Marec's Filming makes it "refueling alone!"

With advanced Marec's Filming on Gulf Aviation Gator dispensing equipment, Gulf means you of the finest possible quality—plus—the greatest possible convenience.



AVIATION PRODUCTS

Gulf Oil Corporation • Gulf Refining Company

## Eliminate Expensive Wiring Insure Safety on THE AIRLINES



## Neo-Flasher HAZARD LIGHT

Model 6-100

Ideal for lightning avoidance periods, pre-emption, holdings, diversions, and emergency, Neo-Flasher can operate visible for 30 miles in clear weather. Will operate up to 9 months on 3 day oil batteries. Automatically tests "half" oil daylight and "full" at night.

**LIGHT PRODUCTS, INC.** Dept. 1  
487 Commercial Center B • Roswell 60, Cal.

## ACCURATE MINATURE SOLENOIDS FOR THE AIRCRAFT INDUSTRY



Model 20-120 at the left is a pull type solenoid for a carburetor and designed to pull 4 lbs. at 120 v. ac. at 50 cps.

Complete engineering, fabrication and design data on miniature solenoids are ready and can be obtained on request in our 20-page information folder.

**ENGINEERING COMPANY**  
400 8th St., North Bay, Cal.  
Largest manufacturer on the Pacific Coast  
producing aircraft quality products exclusively

## How Good Is the Custer Channel Wing?

- Inventor says design improves performance.
- But NACA test results do not jibe with claims.

By David A. Anderson

How good is Custer's channel wing design? What can you get from the unique layout of half-displaced panels less than you can't duplicate in some other manner?

For an answer, you can read Custer's claims in his company's brochure. You can check back to some of the doubts expressed in an *Airman* Wings report on the plane made after a purported "demonstration" (Dec. 17, 1951, p. 17). Or you can get a copy of National Advisory Committee for Aeronautics Research Memorandum 151A109, and read some actual tunnel test results.

In any case, Custer's claims and NACA's test results do not jibe.

► **Description**—The Custer Channel Wing looks like an other aircraft in the world today. The wings have been replaced with a pair of half-channels embracing the lower halves of a pair of parallel struts mounted near the trailing edge of the struts. Custer says that this layout results in the generation of static lift because the air is pulled over or through the channel regardless of forward speed.

Four basic claims are made for the channel wing also in a company brochure issued by the Custer Channel Wing Corp. in February 1952. The brochure claims that a plane equipped with the wing will:

• "Fly off in a few feet or run vertically and leave it properly designed for that performance."

• "Attain forward speeds in excess of that of conventional aircraft."

• "Shed down, back or under and land vertically under full control."

• "Substantially increase payload, flight range and endurance over that of any other type."

► **NACA Tests**—Now let's have a look at some of the results of the tests made on an experimental airplane supplied by Custer for tests in the full-scale tunnel at Langley Field.

The plane was similar to the one which gave the demonstration at the end of December 1951, with two co-ordinates. First, the measured drag:



EXPERIMENTAL channel wing plane is tested in NACA's full-scale tunnel at Langley.

of the plane was centered with lift for the tests. Second, the capacity of the plane was replaced with variable-speed electric motors between the engines vice not adequately braked for by expansion at high angles of attack.

NACA's main objective was to study the static and dynamic lift-producing characteristics of the channel wing idea, and to study some stability and control properties at zero and low speeds at high angles of attack.

► **Forward Lift**—The airplane weighed in at about 900 lb. without the fuelage casing. The static lift developed under the full-power condition was 140 lb., and the maximum pitching moment was -100 ft. lb.

The resultant force from this set up was 518 lb. inclined at 25 deg. above the thrust line (which is also the channel wing chord line).

In order to trim the airplane under that condition of flight, the negative tail lift required would further reduce the magnitude and the inclination of that resultant force.

Now NACA, (which provided a suitable lift could be obtained) for the plane to provide the negative tail force, the air, in order to have, would

have to be inclined at some angle greater than 45 deg. and the weight would have to be less in magnitude than the resultant force.

The resultant force, incidentally, was about 55% of the static thrust calculated for the propeller operating without the channels.

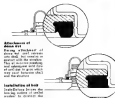
► **Lift**—Incidentally—NACA engineers tried some variations in the basic geometry aimed at improving the static lift that propeller position seemed to have no effect on static lift and neither did an extendible leading-edge flap. The use of an extendible trailing-edge flap did improve the lift by about 25 lb.

Improvement in speed occurred the lift of the wing, but they would not apply during forward flight, and not during any hovering condition.

► **Channel Flow—Effect**—These studies the flow in the vicinity of the channel was checked.

Custer says "... Sections of the Custer Channel Wing in use to controlling the boundary layer or turbulent flow along the surface of a wing and was specifically to the boundary layer disturbance at low speeds. By displacing a laminar flow at all times, top speeds and growth occurred ... Although no section shows whether

**fluids  
can't penetrate  
this barrier**



#### Provides:

- ★ High pressure cooling without sealing compounds
- ★ Inexpensively self-contained assembly
- ★ Single point seal
- ★ Flaring nut with stationary seal, unaffected by successive bolt variations

#### Reduces Installation Time, Weight and Maintenance

Because seal is self contained, no sealing compounds are used resulting in reduced weight. Necessity for maintenance is almost eliminated.

#### SPECIFICATIONS

**Self locking nut** conforms to applicable requirements of ASME B. Available in 10-32 NPT and 1/2-20 NPT 2 thread sizes. Flange 212 in all dimensions.

**Self contained seal** conforms to applicable requirements for equivalent type 1, 2 and 3 per specification ASME B-655. It is resistant to atmospheric elements, salt water, oil, gasoline and most organic solvents. Applicable temperature range: -95°F to +325°F. Can stand up to fluctuating pressure. Applicable pressure range: -50 psi constant to fluctuating operation.

**Nutt-Shel**

801 AIRWAY, OGDON, CALIFORNIA  
Circle 41491 Crapana 5-3092

# DILL LOK-SKRU THE BLIND ANCHOR NUT OR RIVET

ONE MAN INSTALLATION  
IN SECONDS



THE AVIATION STANDARD  
For Blind Fastening Under Heat and  
Stress to Metal Fastening

1 Drill one (3) hole.

2 Insert Lok-Skru with  
either Blind or Power  
Lok-Skru Tool.

3 With Lok-Skru Tool  
draw Lok-Skru into  
drill hole until flush with  
metal surface. This  
creates a Blind Anchor  
Fastener in seconds.

4 TO FASTEN AT-  
TACHMENTS—Insert  
standard Machine Screw  
through hole in attach-  
ment and into Lok-Skru.  
As machine screw is pulled  
into hole, it will draw it at  
sight, locked in place  
under tension. Complete  
fastening of the at-  
tachment.

Control removal (draw-  
al) Lok-Skru provides ac-  
cess to attachment area  
at all times.

## Write for Folder

Ready information on the  
many uses and applications of  
Lok-Skru in aircraft inter-  
structure with complete draw-  
al cycle and data.

THE DILL  
MANUFACTURING CO.

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Los Angeles 15, Calif.



ONE PROPOSED APPLICATION of the CCW-1, which would combine a fuselage

we used, the boundary layer is con-  
trolled at high speeds and turbulence  
and still not eliminated at low speeds."

But the tests show differently. For  
new forward speed, the flow through  
the channel is rough and partially in a  
stalled condition. At a low forward  
speed of about 27 mph, roughness be-  
gan at the trailing edge below 18 deg.  
upward to a stalled condition over about  
40% of the channel at 25.2 deg. and  
by 30 deg. was almost completely  
stalled.

One unusual aspect of the flow into  
the channel. At the top of the propeller  
disk, surface is from the downstream  
line in a reverse direction. With the  
wing operating in non-stationary flow,  
NACA was that its leading edge is  
inverted and its efficiency is lowered.

► **Lift Coefficient**—To get a direct com-  
parison of lift coefficient, NACA based  
the reduction of drag on the channel  
wing area alone, and then on the one  
stationary plan wing area, including  
slotted and interrupted leading edges.

Center has cleared an advisory lift  
coefficient in static conditions. NACA  
said that this is not unique to the  
configuration but would apply to any  
inverted which approached the housing  
condition. Lift coefficient is normally  
proportional to the square of the re-  
verse. As the speed approaches zero, so  
does its square, and the value of lift  
coefficient must reverse (become nega-  
tive), the end test in this case is the actual  
lift obtained, not the coefficient.

Values of maximum lift coefficient  
for low speeds are "... compatible  
with those normally obtained by con-  
ventional airplane with thick wings  
and without high-lift devices," says  
NACA.

► **Stall, Climb**—The companion's low  
thrust climb "... complete control in  
yaw, pitch and roll at low speeds—no  
advantage not found in any plane. This

Center channel wing configuration is the  
English scheme with the standard wing.

is particularly important for control of  
the ship if the power fails. . . . Glide  
characteristics are comparable with con-  
ventional ships."

But the tests found a large variation  
in static longitudinal stability over the  
angle of attack range, and this means a  
serious problem of control at low air-  
speeds.

Says the NACA recommendations: "The  
unintended pitching moments are large  
and cannot be treated with full  
control deflection."

Still on the subject of control, there  
was a slight asymmetry of thrust dis-  
covered during the forward flight tests.  
This amounted to about a 25 lb. differ-  
ence, but it appeared full, rather than  
from one side of the airplane. For single-engine  
operation, "... the asymmetry in thrust  
would, therefore, be completely  
adequate and light would not be  
provided with single-engine operation,"  
according to the NACA report.

This would seem to solve the element  
of complete control made for the them  
self wing.

► **Glide Performance**—Here's what  
NACA has to say about the design glide  
performance: "Since single-engine flight  
provides such strong performance that  
powered landings would be required in  
event of failure of one engine, it is of  
interest to note that the maximum  
power off lift drag ratio for the configura-  
tion tested is very low (about 1.7)."

Using the lift drag ratio as a measure  
of the glide-path angle with power off,  
you get a glide angle of 10.5 deg. This  
figure is not at all comparable with con-  
ventional aircraft.

The NACA report makes the first  
statement that the controls, were con-  
trolled, inadequate under static lift con-  
ditions, and the airplane could not be  
flown in hovering flight.

This all adds up to almost complete

## If this man were free to speak...

Much of his thinking is classified as Security  
Information. Much of his mind is pledged to  
science, for the love of his country and the future  
of our world. . . . But this much he can tell.

Already the dawn of a new world is with us. At  
The Glenn L. Martin Company, for instance,  
new aircraft, guided missiles and electronic weapons  
are being designed not as today's flying vehicles but as  
coordinated and controlled systems of tomorrow.

Behind that work is a powerful new team of Martin engineers working together under  
an entirely new concept of business known as Martin Systems Engineering. Today, that  
story is under security wraps, but this one we tell you that—

You will hear more about Martin's



THE GLENN L. MARTIN COMPANY  
BALTIMORE, MARYLAND

# ROBINSON

## Vibration and Shock Control Mounts

### SET NEW RECORDS of DURABILITY



MEFL-FLEX engine mounting system in cross section.

A Single Stage vibration tests run of the many types of Robinson Engine Mounting Systems

Robinson Engine Mounting Systems and Unit Mounts are the most durable ever built for airborne equipment. They employ an all-metal, load-carrying cushion, MEFL-FLEX<sup>®</sup>, which is formed in such a way that all wear is continuous from top to bottom. These cushions are inherently and permanently damped. They do not require external damping devices.

MEFL-FLEX cushions properly installed in Robinson Systems do not and cannot wear or pack. They are correct in theory, durable in practice.

#### Long Service Record

AMERICAN AIRWAYS, Inc., has used Robinson Mounts and Mounting Systems for three years in its Flagship Fleet, and reports that not one replacement has been required during

this period. This represents a service life four times as great as mounts previously used.

Robinson Mounts are designed and built for the operating life of the aircraft and the equipment on which they are used.

Their long life and durability result in important savings of time and money for replacements.

#### Proven in Experience

Specified and used by hundreds of leading electronics, aircraft and industrial manufacturers, Robinson Mounting Systems offer a proven solution to today's problems of vibration and shock.

For more facts and information write for the new Vibration Bulletin No. T20-AW.

MEFL-FLEX is the copyrighted designation for all metal resilient cushion designed and patented by Robinson.

**ROBINSON AVIATION INC.**  
TEBESBORO, NEW JERSEY  
*Vibration Control Engineers*

deflection of the glass made by Custer. According to the tests, the glass will fly, but it won't honey. Current is poor in focused light, and flow through the channel is rough and partially stalled. Single-stage operation would be as possible, and the power of gliderpath would be very strong, not at all comparable to today's aircraft.

## THRUST & DRAG

For the record, Cayuse was the first to fly a delving powered airplane. The date was Sept. 18, 1915, and Ben Sherman—who is now having the radical Cayuse delving for the first time at the controls. The plane was Conant's Model 7902, later to be designated the XP-93.

Let's repeat that first sentence: Cayuse was the first to fly a delving powered airplane. Why all this emphasis? I'm getting in the trend of hearing England credited for the same development of the flying triangle. Last year at Farnborough, the aeronauts and that Britain was the first to fly a delving plane, the month the famous Selsby Review, those signs of the prop, says, "... delving-winged Vulcan bomber which gave Britain the world lead with this type of aircraft." Another quote, one article: "... in Manchester the world's first practical delving aircraft was designed and built."

We repeat, Cayuse was the first.

"We'll stay first the atomic cannon," said the captain, "and it puts us in mind of the old notion of a couple of scientists standing in front of a gigantic engine they'd just finished. One of them says, 'There it is—the million horsepower.' Now what the hell are we going to do with it?' The other says I'll tell about this atomic cannon."

"Elaborate," I said, trying to get the world's attention.

"I always look for an atomic engine in something like this, and I believe that the Area, just made as an atomic engine, just like they were in an engine engine engine."

He turned the engine glass around the last day. "See engine engine engine," he said, "it still doesn't make much sense. You take an Atomic and wrap the thing up in a shell to see from an Atomic engine, that's gotta be dragged up through the mask and close to the engine."

"Performance, you're not gonna be able to fly it with any old one. You gotta have an elite crew, maybe with ball-down gear from the ABC sitting around to hold hands while loading is going on. Then you want to get too out the front where some



HAVE YOUR FASTENING METHODS

*kept pace?*



It's a big jump from XVIII century fire-balloons to the jets that slice across our skies, today... and design changes never stop. That's why it pays to have your fastening methods checked by trained specialists... constantly.

Specialized fasteners, engineered by Monadnock for all types of aircraft.

• Speed Assembly • Easy Maintenance  
• Give Trouble-Free Service

Monadnock, with a wealth of fastening experience, also has reliable development and production facilities available to manufacturers of other quality products.

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**MILLS**  
San Leandro  
California



Subsidiary of  
UNITED-CARR  
FASTENER  
CORP.

# A Salute TO THE LOW-FLYING MEN!



All hail to the one in the "wild blue yonder" ... but he's gone with some  
new steel chieftains for the job who dug it out of his top level. From the line  
they take off ... All the mission is completed, these strategic fighter bombers  
can tactical close support pilots face a brutal blasting off along the way.  
-> -> -> Stiped at by small arms and machine guns ... bracketed by flak  
with the constant hazard of being downed by enemy aircraft  
... these are the stout warriors for whom we've planned Republic's rugged  
THUNDERbolt ... to get them there ... do the job, and bring them back.

REPUBLIC AVIATION

PATRICKSBURG, OHIO, U.S.A.

Masters of the Mighty Thunderbolt. Thunderjet. Thunderbolt. XP-47

sharp boys from the other side can call in behind aircraft and children for the same reason: because before they get off a shot.

And as for this business of being regarded as snitches, I say it's bull. Justify gets targets spotted for it right now by airplanes—although the *Army* likes to admit it—and if you can't see to spot, you're just not doing that day.

I like the mission," I said.  
The *Army* ... Right now we've got a close tactical aircraft that can carry some loads. They can operate from desert conditions for enough back to maintain security. They can fly over, without on the enemy's back. No body gets a chance to report in a few mile carter moving a heavy object up towards the front—they're already in the time they rush on to what's ahead to happen. No air, and if I go to go for a while, I want to have some air about the delivery method.

I want 'em out small, not by the overland stage."

And for the *Army* ... The *Army* ... And it's the big part one so far—goes to these general staff officers who must on cutting back research and development money. I did it with the *NACA* and they're trying to do it with the *Air Force*.

How long is it going to take before they learn that research is a long term investment which pays off only after a decade or so? The work going down today won't show up in hardware until 1960 or later. But if it isn't done today, it may never show up. All the free enterprise in the world can't buy one alive a century.

Then all has a familiar ring. Remember back in 1947 when we were cutting it out of the military budgets, and research and development was among the first alone.

I'll let you and feel the effects of that one, don't you?

What does 1000 extra weight mean to a jet fighter? According to a panel of the Society of British Aircraft Constructors, these extra pounds mean:  
• Top speed reduced by 25%.  
• Range shortened by 15%.  
• Service ceiling reduced by 10%.  
• Rate of climb reduced by 10%.  
• Landing distance increased by 20%.  
• Landing speed increased by 5%.

One interesting security angle of the recent *SAS* ... The papers listed the subjects for the confidential aircraft. Right in cold type was "Air Force *Aviation* for *Palmer*, *Allen* *Frederick*, *Hughes* *Aircraft*." Does the *AF* still deny that *Hughes* has a contract for the *Palmer*? —DAA



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**AEDC OVER-ALL PLAN**

shows location of major facilities being built at new AF research center. Lower left: engine test facility; lower right, propulsion windtunnel; upper center: gas dynamics facility.

## Details of Tullahoma Test Center

The Arnold Engineering Development Center's three major installations—engine test facility, propulsion windtunnel, and gas dynamics facility—are rapidly nearing completion at the Tullahoma, Tenn., site.

The Air Force activity, one of the development centers of the Air Research and Development Command, will compare a majority test and evaluation establishment in several positions associated with high-speed aircraft, guided missiles and aircraft engines. Aero, Inc., will operate the facilities under contract with the Air Force.

• Engine test facility will embody three test chambers and a test bed. Basic, research, development and evaluation will be conducted on turbojets, turboprops and small engines under simulated flight conditions and altitudes up to about 50,000 ft.

An additional facility will accommodate the largest engine now contemplated, and other test cells are planned for a later date.

Engines will be shuttled to the test bed chamber on railcars through quick-disconnect doors.

Temperatures as low as -120°F will be provided. Basic service maintenance



**GAS DYNAMICS FACILITY**

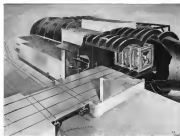
will include high-speed windtunnels that can operate at velocities over Mach 5.

will include air refrigeration and drying, compressed air supply, exhaust gas cooling and exhaustors.

• Propulsion windtunnel will include two facilities—a transonic tunnel and a

supersonic tunnel, each having 36-ft-square test sections. Development testing will be on full-scale operating engines and turbojets installed on missiles or aircraft. Propellers and aerodynamic

models also will be accommodated.



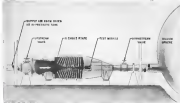
**PROPULSION WINDTUNNEL**

with portable 30-ft sq test section in place in transonic section.



**ENGINE TEST FACILITY**

will contain a test bed and three test chambers such as the one shown in sketch.



**FLEXIBLE NOZZLE**

vents opening at 12-in. square high block tunnel in gas facility. This tunnel started operation in February.

test models also will be accommodated. Test section supersonic velocities will be controlled with a large, flexible-wall nozzle (Aviation Week, May 4, p. 16). Thermal processes will be capable of operation from 1 atmosphere to that as increased as 100,000 ft. Cooling will provide simulation of standard altitude temperatures.

Test articles will be tested on 40-ft rails. A battery of these will make it possible to ready units without interference with those being operated in the tunnel.

Westinghouse Electric Corp., which is supplying the five compressors and the 115,000-hp drive for the propulsion windtunnel facility, reports that work on the station is well underway at its Bensenville, Ill., plant. The compressors and drive will constitute the world's largest rotating machine, Westinghouse says.

• Gas dynamics facility will house a group of supersonic tunnels for developing test of models of aircraft, missiles and projectiles designed for very high speeds. Some of the tunnels will operate at velocities greater than Mach 5.

Two major windtunnels will have 40 sq square test areas. Two others will have 12 sq square test sections.

Power for motors will be a plant housing an axial and an centrifugal compressor. An auxiliary compressor group will feed a vacuum sphere and high-pressure air storage tank, which segment the main compressor plant. The flexible power system will allow operation of test data over widely varying speeds, whereas will improve tests to predict full-scale flight characteristics.

Test data for all of the AEDC facilities will be processed by digital type computers.

## New Value Set for Viscosity of Water

Kinematic viscosity won't be the same after July 1, says the American Society for Testing Materials.

On that date, the National Bureau of Standards will adopt a new value for the viscosity of water—3.0015 centistokes at 68°F. This means that all kinematic viscosities will be reduced by 0.116%, and that all kinematic viscosities—both old Saybolt types—will require recalculation to new values.

Conversion tables showing kinematic viscosity converted to Saybolt Universal and Redwood viscosities will be provided, as will basic values for kinematic viscosity index. All viscosity standard viscosity oils will require recalculation.

New tables for conversion and comparison are available from ASTM headquarters, 1916 Race Street, Philadelphia.





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## LETTERS

### Guided Boomerangs

"These JSP Demos" (Letter in *AVIATION WEEK*, June 1, p. 42) de lauded Navy's use in Korea of obsolete aircraft as "guided missiles." The letter printed below lists at the misbehavior of the JSP story by Navy public relations.

Months after the story of Navy "guided missiles" in Korea broke in the press last September, high-ranking Air Force officers in the Far East Command confidently had proclaimed the Navy as "fools" and "chickens."

Throughout the world, newspapers and radio broadcast the story—in the U. S. Navy—of the use of push-button nuclear bombs that could drop in any Air Force zone.

It shouldn't. The Navy got headlines but never later it was caught at the back of trying to make a story some bigger than the facts.

From the USS *Boxer* off the Korea coast, Navy Guided Missile Unit 50 had captured an enemy Communist T-26 fighter carrying TV transmitters and 2,000 lb bombs. Attack Douglas AD Skyraiders equipped with TV cameras guided the downed enemy Communist aircraft.

What the Air Force said was right. This was nothing new. The Army Air Force crashed gliders, shot down fighters into German hands in World War II.

The Navy was first to take credit, place in *News* "The winning headlines" for the Navy had to make the downed appear a broad new weapon just out of research.

I was one of those correspondents the Navy never shared the facts.

The Navy had advised the first wire service to send me to Task Force 77 the "big story—let by to me." They told us there was to be an important article.

United Press sent me, International News Service assigned me a photographer (AP and INS were making their pictures and stories).

When we landed on the *Boxer* we were told to go to the radio where the story's already been written. I was to be a reporter.

"We are launching guided missiles from the carrier, but it is a top secret. You are here to report only a single. Remember, if you write about the secret, you will be subject to court-martial."

With these words first in our minds, we were taken to our cabins. My room mate was a senior advisor on the guided missile program, a commander in general assignment from Washington.

The AF was loud, loud in a radio with another guided missile specialist. Some how the JSP was called on. But it seemed apparent the Navy was looking to the "great" story.

I decided to write it and submit the story to my editor in Tokyo. The AF was not made the same decision. I learned later INS believed stories would never take the ship and didn't write it.



Finding out about the missile was easy through the *Boxer*. We were "allowed" to work with the launchings but not permitted to take photographs.

The downed had a power plant, bridge and fuselage cutters. All were caught in terms too many for the guided missile to operate without risk of falling a peak.

The TV transmitters in each downed could be picked up by the carrier plane and by a receiver on the carrier deck during the flight.

The TV screen showed the controlling officer in the shipyard to keep the down on the target until the last second. All this was new to me. It was a new way to fight a war.

It also gave the Command a surprise. Our downed followed a group of Korean planes a natural lead on into a target.

The controller in the carrier plane and he saw the Korean look up at the down and lead for the target, apparently thinking the down was going to strike them. They looked "looking" at the down just moments before the down, and in an of explosion, followed down into the carrier.

We day 1 opened in Tokyo. I made the story and submitted it to press. Navy was on. They promised when they saw the words "guided missile."

I used "guided missile" to describe the downed in two reasons.

1. Technically, they were missiles and they were guided—although far from the dock. Dimension 5 types 50 were perfect of it.

The Navy said something then was a "guided missile" strike.

Of course the story said what type was out of the "missile" was.

The carrier would have my copy even when I showed them an issue of a popular science magazine that had explained fully how the Navy was doing. I didn't and preparing them for me as Korea.

General submitted that once the magazine already had had Navy cooperation in preparing the article, the only security information was involved was actual use of the weapons in Korea.

I took my enclosed dispatch to the Navy Public Information Office which agreed to send it along with a few more close areas at Washington. The PJO waited two days before sending the story, presumably waiting for the AF to file.

About 10 days later I got the shock of



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my life. AF is a struggle for James, Rockford, Pease, Woodbury and the Greenwalds. Club and road. "AF is an act with the inside story."

"Part, one of the most involved areas in this news business is the double. 'You should see it,' he said. 'It's because AF left out that these things are just old Hollywood carrying the line.'"

I pulled up a copy of Tokyo Evening News and saw the AF story. It took about half an hour, thinking outside, that report of the dead is spectacularly in left the crew "bumping into contact."

"There was an opinion that these 'news' were considered, possibly during the on camera editing phase. This was the first scene of the project related to the police."

"AF didn't 'let out' anything intentionally (although it put in some final changes). News comes in Washington had agreed to release the AF story if AF notified someone of Helsinki, TV and 2,000 to London."

After agreeing to release the AF story, the Navy in Washington sent a message to Tokyo regarding release of all "dead" stories with the same disclaimer. Through some Navy leaks the LP dispatch had already arrived in Washington on May 10.

News items before the message arrived on May 10, AF in Tokyo received a cable from the New York Times: "AF story 'AF OUT WITH MIDDLE STORY'." We let my story go as I had written it.

Editors inside these front pages, after

summons, accept that more scripts. In-persons started.

"The Navy called in representatives of all these agencies to a conference in the Pentagon. It seemed OF releasing security information."

A high-ranking Navy officer said that would make it difficult for my reporter to get ahead. My story is even to get information to the Pentagon.

"Is this a threat?" asked the AF representative, Herbert Packer. "He was arrested it was said and that the officer didn't really mean what he said."

The Navy dropped the matter that day, when it became apparent it was in no position to take action without further convincing staff.

Editorial writers were holding the Navy for the way it had used censorship to get better play in the pages.

Tom Maguire wrote "In the battle for bigger headlines, press officers for the military sometimes try to make a news story any larger than it actually is. Last week, through the canal of its own cause, ship wings, the U. S. Navy got caught in the trap."

Time called this maneuver a "spiral" because it had misled LP with leading the "down down to sea."

Unbeknownst, the episode brought credit as the editor Navy, achieving the desired result with working in the public position daily.

Knowing what the Air Force situation would be after the story was out, we called

up Brig. Gen. William P. Nichols, Air Force's Air Force spokesman at the time, for his comments on the Navy guided missile program in Korea.

He agreed, Nichols said nothing. But he told me 20 minutes. Air Force pilots, command and other personnel were not in Korea in this respect.

Was it just a Navy story? I don't think so.

No action can be made for the officer in Washington who tried to deceive the public by releasing the story without the facts to get it in front. That was bad public relations. It hurt the news, young men on the base who were on the Pacific operation.

They were looking things out, they learned about pilots could operate against an enemy base a closer without interfering with actual combat operations on the other side.

They were leaving things that position in the Korean theater.

They also attempted to keep and give the Communists something to think about. For, and something more as a push button, water is involved in Korea, I am sure of having records. His facts made accurate by some, before pilots in Korea.

"The Navy's guided missile. Why, we were wrong about things in Germany."

Robert Gates  
United Press Correspondent  
Seoul, Korea



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## PRODUCTION

# Why Designers Are Using More Plastics

- Engineer reports easy maintenance, low costs.
- Resistance to corrosion and fatigue also is cited.

By Irving Stone

Confirming progress in the use of reinforced plastics was demonstrated recently when a group of about 350 engineering representatives of aerospace business, aircraft suppliers, molders and manufacturers met at the Grumman plant, Bethpage, N. Y., for a session of the Institute of the Aeronautical Sciences' New York section.

Already these plastics are being used widely in up-to-date military designs. They have been used in such a wide range of aircraft, from the big Boeing B-52 to Navy's advanced fighter, the General Sea Dart. Test installations already have been made in jet engine compressor sections. The prospect is that tomorrow's engineers will incorporate an increasing amount of the material.

► **Why Plastics?**—In the short life of the reinforced plastics industry, many designers have been found at use of these materials for high performance aircraft and missiles.

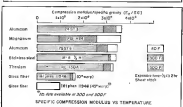
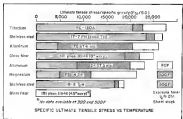
William E. Brashers, chief engineer of Zenith Plastics Co., Coalinga, Calif., outlines some of these features in a paper prepared for the IAS session.

Brashers stresses ease of maintenance in the field and resistance to corrosion effects of air at high temperatures, air water, high humidity, aquatic fluids, hydrostatic loads and lubricating oils.

He also says tapered thicknesses required in most modern aircraft wings and tail surfaces can be produced from reinforced plastics with no need of labor and expensive equipment and that molds and tools for forming the aircraft structures are less costly than equivalent tooling in steel metal.

► **Some Applications.**—Brashers notes that plastics have been designed for as high as 35-psi static pressure, to withstand loads applied by 2-in. half-tones at aircraft winging speed, and meet good-level pressure of 20-in. column.

Electrical requirements in several large bomb-bomb-type aircraft have necessitated the use of reinforced plastics as part of the primary structure. In



some cases, almost entire sections of the planes are structurally reinforced from the rest of the structure by using large reinforced plastic parts in sections.

The bending, shear, tension and local loads are critical from the isolated metal structure—what serves as an extension of the reinforced plastic structure to the rest of the plane.

Brashers estimates that Zenith has made 100,000 in- and wingtips and about 75,000 radomes for military aircraft. These parts and others are listed in such sources as Canada's NPTV, Sea Dart and B-56, Lockheed's PVN Neptune, WV-1 Super Constellation and F-50, McDonnell's F-100, Douglas and NF-104, Boeing's B-52, and Republic's F-4.

One design component now being produced in reinforced plastic at Zenith measures 17 ft. long, about 6 ft. high and 3 ft. wide. No wings, handholds or steps are needed—it is monocoque, honeycomb structure in her without about 300-ft. of aluminum design load in static test, Brashers claims.

► **Plastics in Metal-Laboratory** test data, offered by Brashers compare specific physical properties of sheet metals and reinforced plastic material for various temperatures. (The specific physical property is, for example, the ultimate tensile stress divided by the specific gravity.) Some of these test results are shown in the accompanying charts.

Above 300°F, the most promising



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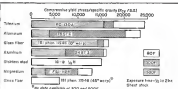
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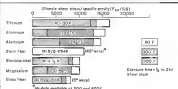
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SPECIFIC ULTIMATE SHEAR STRESS VS TEMPERATURE

materials appear to be titanium, stainless steel and glass fiber/Bakelite phenolic laminate, Brinkman says.

In sheets of equal weight, glass fiber/phenolic laminate compares favorably with metal alloy sheets on a stiffness basis, he claims, although the shear strength and the modulus of the glass fiber/phenolic laminate are poorer than metal. But because of the inherent ease of constructing glass fiber sandwich components, their characteristics may be overcome, Brinkman claims.

The data shown for the glass fiber/Bakelite phenolic laminate are for 181 cloth. Greater values are available for combinations of 181 cloth and unidirectional glass fiber cloth (245), he says.

Design Data Available—There now is sufficient data for engineers to design wings, fuselages and tail sections of previously available plastic materials. Furthermore, these aircraft structures can be manufactured at much less cost than for corresponding metal counterparts, Brinkman told Avionics News.

Grzech has made studies indicating that some structures can be built for as little as 20% of the cost of the equivalent in metal, he says. These studies were made on lightly loaded

parts and the plastic structure was designed to conform with the most efficient techniques in use today. Minor components such as wing panels and fuselage sections were analyzed. These design studies indicate the feasibility of plastic parts for planes and missiles now in building, Brinkman says.

Exoskeleton Suits—in a typical design, he claims, the plastic suiting will require only about 10 to 15% of the component parts of the equivalent metal assembly. This has a substantial effect on the engineering task. Only about 20% of the engineering man hours required for a metal suit are now needed to design a replacement plastic structure to meet the same specifications and requirements, provided the engineer has adequate knowledge of plastic materials, Brinkman says.

Older exoskeletons also result in space, weight, and production and maintenance force requirements.

Brinkman doesn't see the "place of the future" as being made up entirely of reinforced plastics, but rather as a combination of plastics and metals. The reinforcement for the plastic might encompass a variety of stress material as well as a metal reinforcing element.

Engine Research—Apparently there is a strong possibility that reinforced plastic blades will be used in turbojet engine compressors, Avionics News Mr. J. P. 180, the 185 engine learned.

Dr. Elmer Wenden of General Motors Engineering revealed in his paper an eight-month study. He said that the art of producing these blades has matured to the point that model test engines are being assembled at this time.

The application of GLE-1-LD to General Motors' temperature-resistant plastic used in the engine part has resulted in moldings that appear to be more reliable in centrifugal loading and in fatigue resistance than the steel blades they are expected to replace, Wenden claims.

Another prime example of plastic design in the use of the phenolic material is the jet engine compressor stator case.

In each of these applications, resistance to approximately 500 F for prolonged periods of time is necessary. Tests indicate the complete reliability of the parts for these applications, Wenden says.

He also reveals that the fabrication of structural parts for use at temperatures around 1,200 F for periods of several minutes, and at temperatures in excess of 1,000 F for 30-60 sec, has also been successful.

Blade Applications—From a reliable source, Avionics News learned that successful ways have been made in one jet engine using, in the first six stages of the compressor, Phenolite-reinforced plastic blades enclosing General Motors' phenolic liner. This has cut the normal rate of the 600 SAE per cent structural development design rate by one-half, he says.

The blades have been made in matched steel dies, with the glass distribution material being laid in the flow of rollers and extruded through the pre-cutoff portion of the dies. Blade welding requires less than five minutes and finishing takes only about two minutes more. It is said that under lock-down conditions, cost for a plastic blade in this engine would be about 12 to 15 cents.

Lighter Blades—it is estimated that on this particular jet engine, about 100 lb of weight could be saved by use of reinforced plastic for some of the compressor loading material. In metal, such blade weights are on the order of 1 lb where the plastic blade would be about 4 that weight, Avionics News learned. It is reported that perhaps half of this engine's compressor blades could be replaced with plastic with no loss of weight.

This would seem to add up to less

starting load for the engine, less centrifugal load and less gyroscopic load (in maneuvering). Also, since the blades would be lighter, wheel construction also could be lighter. Another feature would be the greatly decreased loading in the event a blade were thrown.

Other Engines—Experimental plastic prototype blades are also being built for three or four stages in the compressors of two more powerful jets. In one of these engines, the weight of the metal blade is said to average about one pound, so that the plastic counterpart, with its 1/2 weight, would introduce considerable savings if found successful here.

Another high speed jet, test model studies are now being read out in reinforced plastic, it has been reported.

Turboprop—Too—The turboprop engine, too, is the subject of study for incorporation of plastic blades in the compressor. One of these engines will be investigated with plastic parts in the first low compressor stages and again in a number of the middle stages where the heat rise relatively high, it is said.

Aside from the savings in critical metal, plastic introduction gives the rapid production possible for the reinforced plastic blade. Also, critical fac-



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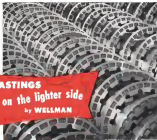
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## CASTINGS on the lighter side by WELLMAN



ing and grinding tools are released for other work.

► **Radiation Damage-Problems** encountered in rubber processing were outlined by Sergio S. Givens, of Radiation Photo Chemicals & Engineers, Gardena, Calif. Protection against gas-burst effects is one of those.

To curb these effects, a glassy-like sandwich was brought out at the Naval Air Development Center, Jacksonville, Fla. This solution was very satisfactory for small sections, but the thin cross section was not adequate for the larger installations.

Later, Zenith Plastics developed a foam known as Zenithon G, to act as a shock absorber in rubber sandwiches. This material is used in thousands of rubbers in gasket systems, Olesky says.

Heat resistance has brought headaches, too. Research by Olesky and an associate has resulted in development of a new material and a diea segregation system that absorbs the energy of a hotzone, instead of transmitting it through the plastic sandwich. A big tip point of this construction has recently withstood the impact of a 2-in. steel ball dropped 25 ft, Olesky claims.

Most sections with edge control are made by the "lost wax" process, which provides segregated elements in the rubber core into which hot air may be forced from a heat source. With proper design of wax and corals, a constant stream of warm air is circulated under the rubber skin to keep it pliable. The system was developed at Douglas Aircraft, and licensed to Zenith for fabrication.

To combat skin erosion, a special coating of synthetic rubber and other ingredients has been developed. The coating will greatly increase the life-expectancy of rubbers without appreciably affecting efficiency, Olesky says.

► **Parts Degradation**—Typical aircraft parts fabricated of reinforced rubbers were displayed at the meeting. Russell Reinforced Plastics Corp., Lombard, Ill., showed high temperature ducting, duct adaptors, wire ducting (see left), duct shields, radio antenna duct and flaring, trailing edge, lip and junction box housing.

Zenith parts included wingtip ribs, lower and stiffener ribs for the B-51, flares, channel and ducting.

### New Places to Distribute

(McGraw-Hill World News)

The Hughes-Halliday has reduced a large number of Lockheed F-10V Neptune patrol bombers to replace its World War II-vintage Lockheed Blimps. The Neptune will join two generations of Grumman Avengers also to come from the U. S.



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# Every B-36 lands on U-S-S Carilloy Steel

When 179 tons of B-36 drops down on a landing strip, tremendous stresses are built up in the structural parts of the landing gear. Only the highest quality in steel can handle this tough job, which is one of the most exacting in the aircraft industry.

All of the rugged main columns for these landing gears are made from U-S-S Carilloy electric-furnace steel quality ingots. This high quality alloy steel provides the great strength and shock resistance demanded in the performance of the finished part. The main columns for these landing gears are forged. The original ingot, as shipped to the forger, weighs approximately 37,500 lbs. From it are produced two columns each weighing about 1200 lbs. In other words, approximately 93% of the steel has been removed—with a

mere 7% of the original ingot left to do this tremendous job. Obviously, this steel must be of the very best quality.

The same care and skill go into every ton of U-S-S Carilloy steel that you buy, whether it's a giant alloy ingot or a few tons of special steel. Our experienced metallurgists keep a close check on every link of steel to make sure it has the strength, hardness, toughness and machinability that's needed.

If you have a special steel problem, let us know. We'll be glad to help you with it.

U-S-S CARILLOY electric-furnace steel quality steel meets every requirement for these vital parts. The precision machining and expert heat treatment they get at Cleveland Carilloy Tool Company complete the job.



NO ORDINARY STEEL could withstand the huge shock loads imposed on the main landing gear of Carilloy's giant Air Force B-36 bomber. The plate has a maximum gross weight of 350,000 lbs., with still higher landing shock loads. U-S-S Carilloy steel has more than enough strength to hold up under this severe punishment.

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They can take it with them...



Front View of C-118  
In Flight Trainer as  
it appears installed  
on an outside train-  
ing room. Corps head-  
quarters' stores ad-  
dress the company.  
Trainer's name is  
H-20 with serial  
number.

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equipment operating at high power densities. Weiss believes in the cramped equipment, a component may pick up more heat by direct radiation than it does from the surrounding air. Also, convection currents set up which result in large differences in ambient temperature at different locations within an equipment case.

Another shortcoming of ambient temperature rating, Welch said, is the considerable inaccuracy in the techniques used by different groups to measure it. Differences in measuring ambient temperature within their equipment. For example, during CAL's field survey it found some engineers where the leads of thermocouples used to measure ambient temperature were awkwardly protruding just out of the equipment, exposing to convective cooling.

With recommended that component manufacturers switch to a new system and rate their components in terms of maximum allowable surface temperature. He advised that some manufacturers were considering making the change.

Surface temperatures of components can be measured in several ways. Welch indicated: "The new temperature-sensitive paints that change color with temperature have a reported accuracy of  $\pm 3\text{C}$  (about).

Calibrated waxes, which melt at a predetermined temperature, are also easy to use and have an accuracy of  $\pm 1\%$ , Walsh said.

For most accurate measurement, Wajda recommended closely collected communities.

► **Recipe for Good Translation:**—"The recipe for good translation is the same as for good medicine. Keep them dry," Dr. W. H. Sattler of Bell Telephone Laboratories.

The conclusion comes from extensive investigations into the causes of transient failures. De Sitter identified three as:

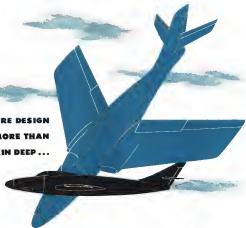
• "Sudden death," found in point-contact transistors, is the sudden change in alpha (amplification), particularly when the collector is operated at low voltage.

• "Slow death," found both in point-contact and junction transistors, is a gradual shift in transistor characteristics, particularly collector impedance.

• "Sleeping sickness," found in both types of transmission, but a more serious problem in junction transistors, is evidenced by the appearance of a sensitive potential at the emitter when a bias voltage is applied to the collector.

Sudden death and slow death can be caused completely by hemorrhaging during the turnover, Simon said. He said that Bell Labs have operated horizontally sealed point contact tubes on the almost 6,000 tubes without

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There can be no compromise with craftsmanship in the production of components for these planes. They must be made precisely as designed. For this very reason, Bendix aircraft products rely more and more on Lavelle for jet component—turned out to meet most exacting specifications.

Years of experience in fabricating stainless steel, aluminum alloys and other allied materials have earned Lavelle a reputation as a truly unique and reliable subcontractor.

# Lavelle

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significant change in their characteristics. Subter continued that bromine sealing would adhere but not cure all gaskets, transistor drying actions. However, he implied that Bell Labs is working on other fans to wipe out this transistor disease.

Hemlock seals can take the form of glass encapsulation in a metal case with a glass seal, Subter said. He also suggested the possibility of growing non sealed transistors in a single container and using a desiccator to keep out moisture.

► **Diodelectric Amplifier for Servo-Drive** Amplifiers, employing voltage sensitive diodes, showed first appearance in the field of non-linear oscillations, J. L. Johnson of Bell Labs, Inc., told the ECS. One beforetime limitation to their widespread use is that diodelectric amplifiers are extremely sensitive to changes in humidity and temperature, Johnson said.

Johnson described a two stage radio-frequency diodelectric amplifier with a power gain of 10 db per stage and said his company also has applied non-linear diodelectrics to multivibrator and electrically adjustable filter circuits.

► **New Dielectric-Liquid** A new high dielectric solid isolated from wood tar, when used as an insulating compound for paper capacitors, extends their operating temperature range, certain, and improves performance, according to a paper prepared by Dr. Gerald T. Kohnen of Bell Labs. The new compound is said to be chemically inert and have a dielectric constant of 10 at the solid form.

Designs of transistors that must operate at temperatures of 300C are due to use of gases for dielectrics, Dr. Kohnen predicted.

Such gases as sulfur hexafluoride and the fluorocarbons under 50 psi pressure show a dielectric strength nearly equal to the oils now used in transformers, Kohnen's paper reported. It predicted that use in radio waveguides, cables, and transformers.

► **Protective Coatings** — Unmatched epoxy resin has better resistance to humidity than polyurethane, L. J. Martin of Hughes Aircraft Co. reported, and urged its use for protective coating on shield circuit wiring. (Wayne Weinberg of HMC was co-author of paper.)

Martin said that a 25-35 mil coating thickness offered optimum humidity protection but prevented easy removal of components for maintenance. Reducing coating thickness to 2-5 mils makes it possible to remove components but naturally reduces humidity resistance, Martin pointed out.

► **High-Temperature Resins** — Selenium antiferries capable of operating at 300C are now available and even higher temperature units are in the offing, re-



## DOG TAG ON A ROCKET...

Rockets are elusive weapons which are frequently lost in the outer space. There has long existed a means to recover rockets which is hard to track.

The new a Bendix Pacific Radio Beacon is installed in the missile to provide a continuous radio tag. These Beacons, which weigh only 3 1/2 pounds incorporate both a receiver and a transmitter, providing a powerful signal which is received on 3 antennas. In addition to use in missiles, the Bendix Pacific Beacons comply in civil aviation problems.

loss, reduce the time of locating, suggest the airborne radio beacon and, in effect, increase the use of space devices in military (and civil) service.

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# AEROPRODUCTS ACTUATORS CONTROL "FLYABLE TAIL"

## Self-locking features aid Republic's new F84F



Typical Aeroproducts Actuator

The broad adaptability of Aeroproducts actuators has helped to solve problems encountered in the design of the "flyable tail" of the new Republic F84F jet fighter. The application of these actuators permits instantaneous adjustment of a variable surface to any position within its design range. The self-locking feature of Aeroproducts actuators secures the adjustment until it is changed by the pilot.

Any combination of systems—hydraulic, pneumatic, electric or manual—can serve as the primary power source for Aeroproducts actuators. They can be synchronized readily in tandem or in series to provide coordinated control of related movements.

Advanced uses of Aeroproducts actuators include those for the control of the "flyable tail" of the Republic F84F, the horizontal stabilizer on another high-speed jet fighter and the afterburner nozzle on a jet engine. Additional applications include control of wing flaps, door locks, bomb bay or cargo doors, gas turbines, variable wing sweep and incidence, wing fold and canopy slides

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Designing for tomorrow*



# Aeroproducts

ALLISON DIVISION • GENERAL MOTORS CORPORATION  
DAYTON, OHIO

moving to a paper proposed by G. B. Farnsworth of General Electric.

Operating at 100C, these selenium resistors have a 7,000-hour life expectancy with only a 10% drop in output voltage during the period.



## Unskilled Can Use Electronic Checker

Unskilled operators can quickly check position, capacity and induction against a preset standard value and read the deviation directly in percentage using a new device developed by Radio-Electronics Industrial Electronics Co. The new Model E-1 comparison bridge can also be used to compare the values of two components which must be matched within a given tolerance.

The device is capable of checking components in the following ranges: resistors of one ohm to five megohms; capacitors of 500 pF to 2,000 µF; inductors of 1 mH to 10,000 henries; accuracy is 0.1% according to scales, 2510 Post Oak Road, Bloomington 10, Tex.



## Two-Axis Gyroscope Floats in Liquid

A two-axis displacement-type gyroscope is floated in liquid to enable it to withstand vibration and shock encountered in guided missile applications. This gyro was developed by Aeromarine Gyro Co. of Santa Monica, Calif., for several missile manufacturers. ACS says the device is the first two-axis floated displacement gyro to be made available to the missile industry.

The ACS gyro weighs approximately

# NEW T-J Spacemaker AIR CYLINDERS



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three pounds. It has 500 deg. freedom of movement about one axis and is 95 deg. movement about the other. The new gyro has a small auxiliary motor which can be manually operated to stop and align the gyro with its zero. No gravity sensing system is provided in the current model.

AGC says the gyro can be made suitable using either d.c. or a.c. rotation and with either d.c. or a.c. pick-off. Radio does drift rate is quoted at approximately 1 deg. per minute with d.c. pick-off, slightly less drift with a.c. pick-off.

Aercon Corp. Co., 1509 Colorado Ave., Santa Monica, Calif.

- 199999**  
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**50000**
- **IRE Components Group Formed**—A new Industrial Group on Electronic Component Parts has recently been formed within the Institute of Radio Engineers. Floyd A. Park, formerly with the Col Tech Jet Propulsion Lab, now employed by Northrop Aircraft Co., is chairman of the new group. A. W. Rogers of the Signal Corps Engineering Lab is vice chairman.
  - **New G8000 Radio Tubes**—Gallatin Inc. of Los Angeles is building 10 new

superminiaturized versions of a radio tower for use with the AN/CPN-4 military CCA. The new tower will be capable of handling two simulated aircraft on CCA radar screen and putting those "aerocraft" through a variety of maneuvers for training CCA operators.

• **USAF to Speed UK-Air Force** is trying to speed the flow of information to manufacturers to tell them how their equipment is performing in the field as it is called. Major General Donald L. Put of the ARDC told the IRE recently. For example, a copy of an "Customer Report" (CR) is forwarded to a manufacturer as soon as it is received by the Air Material Command instead of waiting for AMC study and analysis. General Put said.

• **GVA to Telescope Flight Data**—Chance Vought Aircraft shortly will take delivery of its new Design/Profile Driven telescoping ground station equipment for use in aircraft flight tests. The equipment, similar to that now used by Boeing and A. V. Roe in Canada, will permit ground crew to check reality of flight test while in progress, thereby expediting tests.

• **Northing House Reliability Group**—Northrop Aircraft Co. has recently set up a group whose sole task is to find entry and means of improving the reliability of engine equipment used in Northrop's turbine engines. Douglas Aircraft Co. and North American Aviation reportedly have similar groups.

• **Hydro-Aire Buys Analog Computer**—Growing use of analog computers outside the defense and arms manufacturers industries is indicated by recent purchase of an analog computer by Hydro-Aire, Inc. of Redwood, Calif. The computer will be used to simulate control system and turbine performance in the turbo ducts which Hydro-Aire designs and builds. The device, called EASE (Electronic Analog Simulation Equipment) is manufactured by Reddy-Schmitt Co. of Redwood, Calif. Hydro-Aire believes itself to be one of the first aircraft accessory manufacturers to buy an analog computer.

- **Adhesive Laminates**—New technical bulletin describing equipment of use known as the vacuum field anchor.
- **UHAF test equipment** for measuring impedance, voltage, power, VSWR, attenuation, and reflection coefficients, as described in a six-page bulletin prepared by General Radio Co., 275 Main Ave., Cambridge 39, Mass.
- **Electronic facilities** and services of the Genett Corp. are described in booklet 483. The 16-page bulletin is available from Avtech-Medical Co., Los Angeles, Calif.

—PK



## ENDURO helps give big bombers a lift

Those two pods hanging from the wing of this B-46 each house two jets. They're a big help in getting the atom-smooth bomber airborne.

Each pod has a wall pipe made of Republic Enduro Stainless Steel. And here's one of the reasons why:

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## EQUIPMENT



VICKERS' Universal Turbopump Engine Simulator will look like this in production.

### Jet Fuel Controls Tested Cheaper

By George L. Christian

A jet engine simulator, capable of duplicating with high accuracy jet engine inflight operating conditions at a very small fraction of present costs, has been developed for Navy's BuAer by Vickers, Inc. (Aviation Week May 11, p. 85).

The Universal Turbopump Engine Simulator, as it is called, is the first of its kind to be produced in this country, according to the manufacturer.

Consisting of an infinitely variable speed hydraulic drive and an electronic analog computer, it is to be used for developing, testing and calibrating fuel control components for gas turbine engines. Two years of intensive research in cooperation with the Navy were required for its perfection.

► **Operation**—Here is how it works: The jet engine manufacturer supplies an equilibrium fuel flow plot for the engine to be simulated. This plot is transferred to a grid of cellophane which is placed over an oscilloscope in the computer. A technician then adjusts a series of controls which make the scope's beam plot trace coincide with the fuel flow plot. This regulates the simulator to duplicate exactly the fuel flow characteristics of the engine in question—for all practical purposes, the simulator is the engine.

Characteristics of the fuel control which is being tested can then be checked by observing oscilloscope tracings.

► **In the future**—Vickers says many potential customers for its simulator. Among them are jet engine manufac-

turers, jet engine fuel control makers, jet engine test centers (existing now, but to be passed by civilian establishments as commercial jets get into the air), aircraft buyers, etc.

The Navy has been using the simulator for over a year. Vickers says it has a \$500,000 development contract from BuAer. It also has a production contract which it will start filling soon. Vickers adds that it will provide continuous service to the Navy by doing future simulations on new engines and fuel controls as they come (only being USAF) is submitted to the device.

The engine simulator will be commercially available in a year or a year and a half, Vickers estimates.

► **Many Savings**—Vickers cites three advantages for the simulator:

► **Money saved**. The \$7,000 an hour which Vickers spokeswoman estimates to be the cost of checking out and calibrating fuel controls in a test cell can be reduced to about \$100 by using the simulator.

► **Faster work**. Many months of development work on fuel systems for experimental engines may be eliminated since the device will make it possible for jet engine manufacturers to test completely a newly designed fuel system before installing it on a new jet engine.

► **Versatile**. The simulator is easily adapted to test any type of constant jet engine or any that may be built within the next few years, Vickers says. The simulator can test fuel systems for turbopump engines with fixed or variable speed, turbojet engines with after-



SETTING UP the simulator. Sinclair hasn't come to phase two scope (2). Tech men adjust controls until oscilloscope trace coincides with manufacturer's curve (3). Simulator will now duplicate engine's performance. Other figures show scope pattern for actual engine output to the de-velocity (4), and simulator to end-range deceleration (5), showing slight discrepancy.



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powered GAN's Technical Development and Evaluation Center, Indianaapolis, has run tests of the system in the vicinity of a J-14, B-100, and a Northrop Aerospace Industries in flying with the detector installed in one of its B-47s. Other conventional test installations are contemplated.

Called the Type B, the cable type fire detector, the device is now coming from the laboratory to the production stage. However, Kohn engineers emphasize, it is still in the evaluation phase and not yet ready for widespread use.

► **Detector Features**—In addition to the Type B's features, a result of the

demonstration of electronic tubes, the cable points to these features:

► **Light**—Cable weighs only .01 lb./ft. Coiled and weighs 14 lb. and measures 3-3/16 in.

► **Positive**—The cable is a closed loop circuit. It can break anywhere along its length and both halves remain operable.

► **Heat resistant**—Careful selection of the materials used to manufacture the cable actually resistant to high temperatures over 1,000°F, says Kohn.

► **Resistant**—The solid-picked, coated cable is highly resistant to vibration, swelling and other environmental effects

might be subjected to (in an aircraft) installation. It is almost impossible to short out the inner wire with the outer shield, the company claims.

► **Stable**—The nonconductive insulation for this cable is highly stable, both chemically and thermally. Its coefficient resistance value remains practically unchanged after repeated exposure to temperature extremes. Its characteristic of sensitivity, stability and uniformity can be controlled on a production basis.

The cable, which is designed to be strong through all pathways, fire-hazardous areas in an aircraft, has a standard outside diameter of .070 in.

## OFF THE LINE

Capital Airlines plans to equip its entire Constellation fleet with Sperry engine warning, according to L. L. Gilchrist, the carrier's chief engineer. "The fleet of 12 Constellation 749 models and five 04th-model bought from KLM Royal Dutch Airlines. Capital has been testing the Sperry engine warning system along with the Sperry unit, but in the interests of standardization will install only the latter, Gilchrist told Aviation Week.

The carrier had no complaints against the Sperry. Capital already has Sperry units on two 749 Constellation and five more on the shelf to go into the 04th. Five additional Sperry instruments will be bought for the remaining 749s.

Pan American World Airways' Eagle-Airline Inc. is moving into its recently completed engine overhaul shop at its San Francisco Airport base. The new \$400,000 facility will allow PAA to overhaul all engines used on its fleet, including Boeing Stratocruisers and Douglas DC-4s. Work had been done by outside contractors. Overhaul shop will receive instant payroll of \$300 for approximately 110 employees.

The third of a fleet of three Hindustan Helicopters was recently leased from London to Kingston, Jamaica, in four days. The four-engine plane stopped at Rome, Athens, Moscow, Baghdad, Beirut, Sharjah, Karachi, Delhi and Calcutta before landing at Kingston for delivery to Union of British Airways, the Mission demonstrated its handling characteristics with a two-on-gear fly-by with both student pilot and instructor.

Central Aviation & Marine Corp., MacArthur Airport, L. I., N. Y., has been awarded Civil Aeronautics Administration covering Class 1 and Class 2 requirements, limited operations and limited category and fluorescent inspection.

## Milestones in the March of Progress

1936	First Production Constellation Type Boeing Model 201, 40,000 RTO/hr.
1941	First Production Constellation Type Boeing Model 201, 40,000 RTO/hr.
1943	South Wind Model 900, 200,000 RTO/hr.
1943	South Wind Model 911, 110,000 RTO/hr.
1944	South Wind Model 900, 50,000 RTO/hr.
1944	South Wind Model 912, 175,000 RTO/hr.
1944	South Wind Model 913, 25,000 RTO/hr.
1945	South Wind Model 900, 100,000 RTO/hr.
1945	South Wind Model 921, 200,000 RTO/hr.
1945	South Wind Model 920, 10,000 RTO/hr.
1945	South Wind Model 913, 250,000 RTO/hr.
1946	South Wind Model 916, 400,000 RTO/hr.
1946	South Wind Model 920, 130,000 RTO/hr.
1949	South Wind Model 910, 230,000 RTO/hr.
1949	South Wind Model 920A, 710,000 RTO/hr.

1950 South Wind Model 900, 20,000 RTO/hr.

1951 South Wind Model 900, 20,000 RTO/hr.

1952 South Wind Model 900, 20,000 RTO/hr.

1952-1953 South Wind Model 920, 100,000 RTO/hr.

## Participating in this March of Progress

South Wind products have been used on aircraft as equipment manufactured by:	Individual Engine & Airplane Corp.
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Boeing Aircraft Corporation	Boeing Aircraft Corporation
Boeing Aircraft Corporation	Boeing Aircraft Corporation
Boeing Aircraft Corporation	Boeing Aircraft Corporation
Boeing Aircraft Corporation	Boeing Aircraft Corporation
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## NEW AVIATION PRODUCTS



### Conversion Kits for 28-Seat DC-3s

Civil Aeronautics Administration re-  
strictions regarding maximum safe  
weight in new low-density seating in  
replacements in DC-3s have been over-  
come by several airlines through use of  
a seat conversion kit put out by Trans-  
port Equipment Co.

The kit consists of 14 T211-12N  
double seats, four of which are slightly  
narrower than the rest. This allows  
fitting them into the cabin in the  
front and back, so remainder seats  
with 13 in. can be installed throughout.

Extra leg room is obtained from ad-  
justed side panels which closely follow  
the chair contour. Also, center aisle  
seats can be removed for more space.  
First two seats forward can be revised to  
form a compartment.

In addition to seats, the kit includes  
chassis or bed systems and engineering  
instructions. All that is needed for in-  
stallation is physical drawing and AN  
hardware, the company says. CAA has  
approved installation.  
Transport Equipment Co., Berkeley,  
Calif.

### No Moving Parts in Liquid Level Control

An electronic device for accurate  
control of liquid level in tanks has  
been developed by Shelby Electronics  
Co.

The new control uses no floats, be-  
lieves as other moving parts. Its only  
contact with the liquid is by stainless  
steel rods suspended at a predetermined  
level. Accuracy is said to be completely  
independent of pressure or tempera-  
ture.

The device uses cold cathode tubes,  
eliminating the possibility of hot tube  
failure. These tubes, the Shelby T2-1  
tube 5, operate automatically and  
have virtually unlimited life, the com-  
pany says. T2-1 tubes do not require a  
filament or plate transformer in cir-  
cuitry. No warm-up time or stand-  
by current is needed.

The great accuracy of the unit is at-  
tributed by Shelby to the high-impedance  
feedback factor (21 million) of the T2-1  
tube. This allows contact across the

stainless steel electrodes suspended  
within the tank to be less than two  
micro-inches at low voltage, making  
the system safe for a wide range of  
liquids, the firm says. Contact of liquid  
with electrodes causes current to flow.  
Shelby Electronics Co., 57 William  
St., New York 5.

### High-Pressure Switch

A series of pressure-actuated switches  
for use in 1,000 psi aircraft hydraulic  
and pneumatic systems is being pro-  
duced by Wallace G. Lammert, Inc.

The pressure-sensitive element in  
these units is a spring-loaded piston.  
The company claims use of the piston  
provides sensitivity to overpressure  
even at low pressure switches, and is  
vibration-free. Special measures have  
been taken to reduce friction in this design,  
the firm says.

The switches can be supplied for  
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positive control (from 205 to 138F) of the compound. It has two spray guns providing simultaneous use by two operators. The machine uses two-piston engines both for storage and for shipment.

Michels has a special nozzle which throws out a circular sheet of peeling compound at right angles to the body of the nozzle. This is necessary to meet the specifications requirement for "application of an even coating of hot peeling compound over all internal surfaces of the cylinder by spraying through overlapping openings." Depending on the amount of compound, either two coats or two hot, is perfectly eliminated, the compound stays.

Team Metal and Mfg. Co., 6114 Forest Park Rd., Dallas, Tex.



## Aligning Barrel Nut

A self-aligning barrel nut, designed to reduce assembly time in critical areas where highly concentrated loads are encountered, has been announced by Sher-Lock Co.

The nut is said to be 40% lighter in weight than previous types. It is installed by forcing into the load-bearing structure, pressing the nut into the hole and securing it with a retaining spring. Design of the barrel is such that it distributes the load into the surrounding structure. The self-aligning feature helps prevent stress twisting and cracking, reducing the need for extremely close tolerances, Sher-Lock says.

The nut is made in three sizes, a 755-T stainless barrel, a threaded steel barrel, and a steel structure. It is used at the base of the detached and loading foot in the dotted section of the nut. The barrel structure is present in place and punch shaped. The nut is available in three sizes from 1/4" up to 1/2".

Sher-Lock Corp., 9810 Bellvue Ave., Los Angeles 45.

## Reflecting Cover

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The North American B-45 "Tornado" Bomber, like many U.S. aircraft, has many features designed solely for the flight personnel's comfort.

Acting on the logical assumption that a more comfortable pilot is a better pilot, North American engineers called for a cockpit-cooling system of Joy Axivane Fans to keep the flight personnel from melting while waiting for take-off on hot days. When the "Tornado" is airborne, the fans are used in conjunction with a heating system to furnish warm air for cockpit defrosting. On the B-45 photo-reconnaissance bomber, the same fans also keep the camera ports free from fog.

The versatility of this system is largely dependent upon that of the Joy AXIVANE Fan. The fan used on the B-45A, B-50C, and RB-45C provide 230 CFM at 6.5" Wd., yet they are only 6.5" in diameter and weigh but 9 lbs.

A Joy designer handles each fan to the exact requirements for which it is intended. Each fan, therefore, is custom-engineered for highest efficiency. For using proper materials can be supplied from the extensive line already designed. Both single and two-stage fans available. Optional features include straight or bent blades, bonded or finger-mounted, metal construction, standard, and coated covers where required.

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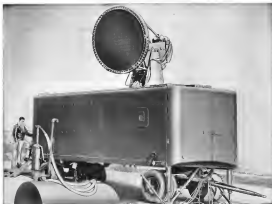
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## AIR TRANSPORT

### CAB Launches New Airline Fares Study

- Board plans to reset air carrier profit standards.
- New passenger rates will be proposed next year.

By Lee Moore

The reforming staff of Civil Aeronautics Board last week launched its first full investigation of airline passenger fares and profits. The Board set a mid-June deadline for the staff to come up with recommendations.

Here are Board instructions to the staff:

- Determine "reasonable" profit.
- Analyze present fare structure.
- Recommend fare changes by next January.

The outlook:

- CAB will propose new rates early next year.
- Airline hearings will be held on proposed rates with which they disagree.
- Board will order fare changes, probably after mid-1954. This program replaces the controversial general passenger fare investigation on which full-scale hearings were slated to start last month.

Adrian persuaded the Board staff to drop that investigation. Since Board officials agree that the new study, followed by hearings, will be more efficient because it will narrow the issues before going to hearing.

Other Board officials are skeptical. Partly because in the 14 years of CAB history and regulation to date, the domestic airlines have earned an average of 67% annually on their total investment and 32% on their common stockholders.

In the last three years the airlines have earned 32 to 35% on total investment and 12 to 15% annually on the common stock equity.

Staff Study Details—Here is the final, official plan for carrying out the staff study, according to Gordon Ryan, director of the rate-making Bureau of Air Commerce.

- Survey present fare structure.
- Develop new rate and profit standards.
- Adjust present rates to fit the new standards.

Detailed explanation of the plan as outlined in the program memorandum approved by the Board last week:

The staff study has started an study as of the existing fare structure. Major

Airline	Domestic Trunkline Earnings		Domestic Trunkline Earnings	
	Net return on total investment	Net return on total investment	Net return on total investment	Net return on total investment
	1947	1948	1949	1950
American	11%	12%	12%	12%
Eastern	12	12	12	12
YNA	15	15	15	15
United	16	16	16	16
Southwest	18	18	18	18
Continental	19	19	19	19
CSS	21	21	21	21
Colonial	23	23	23	23
Continental	25	25	25	25
Delta	26	26	26	26
Norfolk	28	28	28	28
Norfolk	29	29	29	29
Norfolk	30	30	30	30
Norfolk	31	31	31	31
Norfolk	32	32	32	32
Norfolk	33	33	33	33
Norfolk	34	34	34	34

points of study include variations among firms of different carriers and regions, firm on competitive and non-competitive routes, fast lanes with route distance and traffic density, but differentials between first-class and coach.

Major concern of the Board is the heavy position of dealing a reasonable rate of profit return for an airline. It is especially the problem of all common carriers regarding rates or fares of common carrier nonstop-flyer from

airline, according to Ryan and Ryan Division chief Irving Rado. This is the second rate of profit available to pay off both the debt and equity capital. It is the net profit after taxes that before interest payments as a percentage of total investment (debt and equity). On the first rate of the balance sheet, the identical investment is shown as arrived at by deducting current liabilities from total assets.

CAB always has used it as the main yardstick of "fair and reasonable" profit in scheduling an airline. The Board also now uses calculated to yield an 8% return for domestic airlines and 10% for an international route.

The Board used this yardstick as a measure of value (value) whereby (by high-enough passenger load) on yield enough profit to gain investor confidence with which to build the industry without giving stockholders even profits on their proper reported investment.

But the Board recently has turned also to another financial figure—profit return on the common stock equity.

This is the second rate of profit available to the common stockholders' equity.

—after all other changes including interest on debt and dividends to preferred stockholders.

Then is what the common stock owner of a company get annually as a percentage of the average book value of their equity in their company during the year.

Company directors decide how much of this to place back into new equipment for greater long-term possibilities of that equity, and how much of it they will pay out immediately in cash dividends.

CAR issues of Air Operations now proposes to study possible use of return on common stock equity as a yardstick of "the return."

Not only is it the actual measure of what the company earns gets, but it also is a way in which to avoid distortion of company profits by the debt ratio.

How It Works—In the Trans-Atlantic mid-size one of TWA and Pan American new pending, Boeing announced plans to use an 11% return on common equity as a live and measurable return.

If return on total investment (equity and debt) were used as the rate measure of economic profit, the company could pile up a much higher rate of profit for its stockholders by the mere expedient of borrowing money to increase the total investment, since efforts point out.

As an example, a company starts out with \$1 million equity and no debt. A 10% return granted by CAR on that amount yields \$100,000 profit. Now the company borrows another \$1 million, making total capital available \$2 million.

Now you CAR grants the same 10% return on investment, but the investment actually has doubled to \$2 million. CAR grants \$200,000 profit. The return goes to 4% on the debt, or \$40,000, to the level. That leaves \$160,000 profit for the equity—a 16% return on the investment of the stockholder.

Thus the CAR tells you it must look at the return of the common stockholder as well as the return on total investment.

Study Return—One of the most important issues in the CAR program now study is whether to use the return on common equity as a measure of reasonable profit.

Sales return or margin. Some airlines recently argued the need to use the "operating ratio" concept of accounting on passenger basis. Sales profit margin is gross revenues less expenses. CAR sometimes uses this return, as do other types of companies, as a check on the possibility of sales price marking over cost.

However, in regulatory inter-viewing,

## Domestic Trunkline Earnings 1939-52

	Net return on total investment	Stockholder's net equity
1939*	2.5%	2%
1940*	13	14
1941*	3	4
July-Dec. 1941	14	15
1942	20	22
1943	27	28
1944	18	16
1945	9	11
1946	9	11
1947	—	—
1948	6	9
1949	12	12
1950	15	25
1951	12	14

\*Based on 1939-1940 rates.  
Note: Explanations and source same as Table 1.

CAR officials generally insist that in deciding what is a "live" profit, the first, long-term measure is what is true to the economic reality. Company owners (and CAR) try to arrive at the point (that level) that will make the best return on investment in the long run, based on the present.

The investigation will explore the relationship of sales operating ratios and return on investment.

Long-term profit level. The last major problem in evaluating reasonable rates is the decision as to how long a period to consider at one time. CAR agreed in its majority opinion discussing the passenger fare hearings that at least recent profits were "normal."

Thus, if the average return on investment is 8%, exactly the Board's sales ratio of reasonable return. Commerce Oswald Ryan is particularly concerned over airlines' ability to weather economic reverses in the future. He told Aviation Week that the Board is putting the airlines on notice that they can't look to CAR to bail them out if they let short-term losses in the future. The Board, he says, will then look back to this period of excessive profits as an equality of future individual profits.

Headings Next Year—The scope and background of the fare subcommittee that the Board will propose a number of changes in the airline passenger fare structure. The airlines are likely to agree to some technical adjustments immediately, but to insist any general change that threatens to lower their profit margin. The Board will hold hearings on these adjustments opposed by the airlines.

## North American Fights for Rate Cut

North American Airlines, dormant member operating within the U.S., last week made several major moves to expand its Trans-Atlantic service program and possible Civil Aeronautics Board and/or Congress to let the company keep expanding the north route it pioneered.

The company:

- Bought its eighth four-engine transport, a Douglas DC-4, from Delta. North American already flies five 60-passenger DC-4s and has two Douglas DC-6Bs on order.

- Placed manufacturing orders for its entire fleet, including the DC-6Bs, following good customer acceptance of one converted DC-4 (Aviation Week June 15, p. 14).

- Fleeted former Senator Joseph C. O'Mahoney, veteran anti-monopoly crusader, as a director of North American Airlines.

O'Mahoney says the government has no more grant an airline license as the entire dispute about the northeast route to the newly formed U.S. It is part chairman of the Joint House-Senate Commerce Committee and of the Senate Armed Services Appropriations Subcommittee.

Revealed a one-time, 11-city route plan for its DC-6B, if CAR will allow it. North American now flies 53 to 15 routes a mile runs it could have made a revenue profit margin 3 cents last year on the DC-4 operation alone. Car indicated competition generally charge about 4 cents a mile on strength.

Revealed a 250-page economic study of the air transport business potential, prepared by Robert B. Nathan, American economic consultant, as a North American exhibit in the large regional economic investigation. The study may be incorporated in a Senate Subcommittee report on Civil Aeronautics Board and the so-called "line."

O'Mahoney Talk—Sen. O'Mahoney, speaking at a press luncheon in Washington, based his presentation on the Nathan economic study, which shows that the combined airlines probably will triple the 1952 horizontal market by 1975, and still leave enough room for contracts to fly as many passengers as the combined airlines now carry.

He said the Civil Aeronautics Act was never intended to grant exclusive rights on the nation's routes to 13 "grandfather" companies which happened to get into the act when the act was written. "Incumbent, as is the case of the railroad industry, should not be so insulated because of technical interpretation of the law or a misunderstanding of the extraordinary

## First-Class vs. "Air Bus"

	Conventional First Class	North American Air Bus
New York-Washington	\$19.40	\$7.20
San Francisco-Dallas	65.10	12.15
New York-Pittsburgh	21.60	10.30
Los Angeles-Chicago	78.00	39.00

Source: North American Airlines

progress for the expansion of air travel." Sen. O'Mahoney said.

O'Mahoney added that "business routes which were initiated by 'grandfather' carriers in 1940, 1947, and 1948 were so successful that in 1949 the so-called 'grandfather' carriers had the right and although they did hold as much of the business as the 'grandfather' during 1951, the 'grandfather' would like to see the passenger service from the air."

Open Hearings—CAR holds extensive open hearings next week aimed at cutting North American's coach service back to a fraction of today's volume, as marking its operating viability as only a company return to control flight frequency.

O'Mahoney said that there were 16 trunk airlines when the Civil Aeronautics Act was passed, that "they have been reduced to 13 and pending mergers may reflect another reduction. In only 10 to 11." He concluded that "it was never the concept of Congress that the so-called 'grandfather' airlines would ever be reduced to the use by a few."

Airlines Talk Wages

Wage talks of Eastern, Capital, Northwest, Northwest, TWA and United Airlines with the International Association of Machinists continued last week after a one-day wildcat strike against Capital was cut short by IAB.

Many union demands, general wage increases, shortening of the wage year from bottom to top scale, higher shift differential, night time for holidays, selective pay increases.

As yet no success.

As yet no success.

As yet no success.

As yet no success.

As yet no success.

As yet no success.

As yet no success.

As yet no success.

As yet no success.

As yet no success.

As yet no success.

## Germans Plan All-Piston Airline

But start of new Lufthansa operations is postponed by delay of government agreements with Allies.

By Gerald W. Schneider  
(Middle East World News)

Frankfurt—Continuing delays in final ratification of the Allied-German commercial agreements are postponing the start of new German Lufthansa operations on European and overseas routes.

Propaganda work for Lufthansa operations is being carried out by the office of A. G. von Lufthansa (Lufthansa) (Aviation Equipment Corp.) in Cologne. Only after the commercial agreements have been entered will the "legal basis" have been created on which the Lufthansa can operate. At that time, final arrangements can be expected on the quality and type of planes to be purchased for Lufthansa.

Postwar-Forward Fleet—In the meantime, conversations with officials of Aviation Equipment point to the following developments and trends in the aircraft of German civil aviation:

- Plans for the purchase of jet or turbo-prop aircraft have been drafted for the time being. The Germans feel that jet aircraft can be expected to be purchased for shorter routes and 10 to 15 DC-6Bs or 50s. Caravelles will start operating on trans-Atlantic, African, and Far Eastern routes.

Training Team—German officials are pleased that delivery rates are "getting better."

They still expect they will have to wait up to a full year for delivery of new aircraft.

It is a relief, however, that they will get this time in good way. They say it will take them about eight months after they receive the go-ahead signal to get ready for full-scale operations. During this time, they will train flight and ground personnel, set up maintenance



FF. WORTH TERMINAL HAS BIG VISITOR

Glenn County MC-96 cargo transport is seen on the apron of the new Glenn County, Wash. International Airport, Tex., which was opened for service on April 26. The photo shows the aircraft's USAF transport for

from fitted with a postwar new release. The former Air Line's Martin 202 now the Glenn's post-war, parading a scale by which the air of the big plane can be measured.



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and operating crews and establish overall operating procedures.

New Luftwaffe headquarters personnel will remain in Cologne, although officials are then needed "continually" to return to Berlin. At Convair it is even noted again: "Home port for the Luftwaffe fleet will be established either in Hamburg or Munich, with Hamburg being enjoying a slight edge. If Hanyburg is chosen, the German city would enjoy the dual role of being headquarters for German merchant shipping and civil aviation."

New German pilots are being trained now for Luftwaffe. Again, the shortage of a legal base makes this impossible. As soon as reconnaissance is accomplished, however, training centers will be established at schools in either Hanyburg or Munich. It is probable, German officials say, that American instructors will be utilized in this program.

► **Food and Aircraft Industries**—Aerofac Industries, Inc., of the "American overseas" based in the complete structure of a German aircraft industry at the time. Although officials of Aerofac Industries Corp. say they would like to be able to build new aircraft, they admit it will be "several years" before German-designed and produced aircraft will be available to them.

However, groups in Düsseldorf report a group of former aircraft manufacturers led by Willy Messerschmitt, Ernst Heinkel and Claude Dornier are planning to pool their resources and form a new German aviation industry.

The group planning to enter the U.S. first day results at the headquarters of United Aircraft Corp., tourists are, but postponed the trip until early this fall.

► **Route Plans**—Final determination of routes to be flown depends on delivery dates of aircraft. If long-distance planes are the first to become available, the Germans plan to start operations of Luftwaffe on runs to the U.S., South America and South Africa. If operations begin with smaller types, they probably will open up initial routes to Russia, Poland, Stockholm and London.

The Germans still feel that Luftwaffe operations recently will affect operations of foreign airlines "at the same time to come." Only when the new Luftwaffe can safely attract demand do German officials expect some foreign carrier to begin service here. Meanwhile, Airline System officials said, some time ago, they would contact the German carrier as soon as a German airline started operating.

► **Federal Interests**—American Engineers is now organized with approximately \$1,450,000 in assets. Within three to four years after the start of Luftwaffe, the new German carrier will

have to raise between \$35,354,000 and \$15,715,000. The amount will be raised from the federal and state governments, and from private sources, the federal government will hold the majority of shares. The Germans have no great objective to foreign capital participation in Luftwaffe but any case has been offered so far and that the possibility has not yet been fully explored.

It is interesting to note that the amount needed for the new Luftwaffe exceeds clearly with the total amount of the national income of foreign currencies in Germany, \$34,548,000. This amount, officials say, only \$11,965,000 is spent in Germany by the currency, while an estimated \$22,583,000 is "lost" to the country. This has been one of the most serious arguments of the opponents of Luftwaffe, they feel that a German carrier would be one of the most effective foreign exchange drains for the Federal Republic.

American Engineers, however, estimates that new Luftwaffe will reach "operational readiness" within four years after the start of operations and will be financially self-supporting by that date. Of the total new carrier amount, however, present plan calls for \$50,913,000 to "be paid in U.S. dollars," a better indication that American aircraft and equipment will form the material core of the new airline.

► **Then First Inspection**—Recent estimates are based on the assumption that the German government itself will put a full stoppage Luftwaffe in import phases and export first of about 100 aircraft. This will be expected within a few weeks.

It should be noted, however, that reports of such plans are not covered by this bill. They will remain in effect, until Luftwaffe is fully operational, when on one plane or have Luftwaffe planes separated outside of Germany wherever that is feasible.

► **Watchful Waiting**—The Germans are watching closely developments in four-day service. Luftwaffe operations probably won't include aircraft in the initial phase of operations, but it can be expected that aerial support later will become part of their long-distance routes. The same applies to the future inclusion of airfield and helicopter service in Luftwaffe schedules.

Although the Germans are extremely anxious to become airborne again, they appreciate the fact that time, in one respect, works in their favor as each passing month brings new developments in the continuing picture of civil aviation. They still enjoy a period of "watchful waiting" benefit from the latest advances abroad and withhold their first decisions until "all the results are in."

## Fred Lee Starts Safety Reshuffle

Civil Aeronautics Administrator Fred B. Lee last week started his long-awaited reshuffle of CAA's Office of Aviation Safety by naming a new chief and deputy chief of the Aircraft Emergency Division.

William H. Weeks, head of the Aircraft Engineering Branch in the Kansas City, CAA office since 1942, was transferred to Washington to succeed George Haldeman as head of the division. Waldemar A. Mikol, who has been head of the CAA Aviation Safety Division in Los Angeles and is recognized as one of the best qualified transport engineers in CAA, was named deputy chief.

Haldeman, who has been on leave on a special assignment as head of the CAA in New York, returned to duty here last November, continues in the same assignment. Harold R. Haskins, former CAA chief engineer, now continues his assignment with the turbine transport team.

Chas. B. Welling, Deputy to Haldeman and since November acting chief, is named to lead Weeks' regional staff in Kansas City. Changes will be effective within a few days.

► **Headway**—Vern-Gibson was the change as a considerable improvement in the Washington Office of Aviation Safety report. Both new appointments are Massachusetts graduates of Technology engineering graduates, with the added qualifications of aircraft industry experience.

Most of Weeks' experience in the field and in CAA has been with civil aircraft. His immediate assignment is flight base at Kansas City Municipal Airport and was an engineer for Lockheed and Remson aircraft companies. In his CAA work at Kansas City, he has had numerous with certification of light aircraft and the two-engine Rockwell Model 15 transport.

Mikol participated in development of the Douglas DC-3 and DC-6 as

assistant chief of the Analysis Section and previously had worked in the Lockheed Vought and an aircraft design section at the Aircraft Development Corp., Detroit. Before getting the top aviation safety assignment at Los Angeles, he was head of the Aircraft Engineering Branch there, and has had broad experience with transport certification problems.

## CAB ORDERS

Southeast Airlines first and last flight at estimated \$1,051,309 a year from Sept. 1 through to one extra weekly Los Angeles 2-31 operation (American West Inc. p. 45). Adopted June 1, Order No. 12413, Washington, D.C., effective immediately.

► **Costs**—United Airlines temporary rate paid to use estimated haulage cost of \$117,650 a year from Apr. 1 through June 1, 1949.

International Air Transport Association (IATA) decided to have power to set and not allow airlines would change terms of the transportation, the Federal Department suggested. CAB said it would require IATA to make certain that the cost of such rates to foreign carriers. May 29, 1949.

New York Airways granted exemption to serve Farmville, N.Y., using Liberty Air truck Park Airport. May 29, 1949.

► **For American**—United Airlines, Canadian Pacific Airlines and other inter-company agreements approved. May 29, 1949.

► **Inter-company**—United Airlines, inter-company agreements approved. May 29, 1949.

Aircraft pilot certificate of Robert P. Haskins suspended 90 days for flying over the phone and making reports without medical certificate. May 29, 1949.

Aircraft pilot certificate of George L. Lewis suspended 90 days for making accident report without current medical certificate or identification card. May 29, 1949.

American Airlines denied exemption from restrictions on each aircraft on San Francisco and Oakland competitive with TWA and United line Chicago—American flight.

► **Threatened**—Threatened with 10,000 dollars to be paid to the airline for transportation.

► **Systematic**—Systematic flight for profit. American Airlines, the airline, has a 10,000 dollar penalty for each violation of the system. The airline has a 10,000 dollar penalty for each violation of the system. The airline has a 10,000 dollar penalty for each violation of the system.

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## Air Power Is Sabotaged

The dramatic battle of Gen. Hoyt Vandenberg and staunch backers of aviation in Congress to retain \$5 billion that the new Administration wants to cut from the Air Force budget in fiscal 1954 has been subverted by testimony on the Air Force's contract to Kaiser-Fraser late in 1950 to produce cargo planes.

While Air Force Chief of Staff Vandenberg was plugging with a Senate Appropriations Subcommittee to reschedule \$5.09 billion on the premise that even dollar counted, elsewhere on Capitol Hill other witnesses, including the Air Force's Deputy Chief of Staff for Material, were revealing and deflating the cost and production output record of Kaiser-Fraser before members of another Senate subcommittee. They told how KF production costs on the Packet transport rose since 1950 from a budgeted cost of \$487,000 per plane to a current cost of \$1,119,140, with a further increase to \$4.5 million a possibility. Fairchild's current cost for the same plane is set at \$265,067 per unit.

While General Vandenberg was losing the heat and biggest fight of his professional life as the aid to make every minute of every hour count in a constant air-blinking against the Soviet menace, Lt. Gen. Orvil Cook, material officer, was telling the other Senate committee investigators that under the first schedule the Air Force had expected Kaiser-Fraser to complete 134 Packets by May 1952, but that when the date came, the KF Willow Run plant had built one plane.

By Apr. 30, 1953, it had built 44 planes. Under current schedules—after repeated revisions—the Air Force expects KF to complete the contract in March 1954. Fairchild, meanwhile, has bowed out of its C-119G three months ahead of schedule. Gen. Cook admitted that since December 1950 Kaiser-Fraser had received more than \$150 million (See p. 15, this issue).

After three days of official Air Force testimony, stoutly defending Kaiser-Fraser but resulting in adverse publicity for the Air Force at a crucial time, there was a sudden change in tactics and Gen. Cook appeared with a hastily prepared statement that sought to reply to previous charges of committee members that he had needed narrowing their questions. In it, he expressed official Air Force "disappointment" in the KF record.

"It was only intent," General Cook said, "that the first planes produced from this new second facility would cost more than those planes coming from the previously established facility. The margin of that difference, however, is another matter and one we have been looking into with apprehension and regret." The Air Force is disappointed, therefore, in the performance of the Kaiser-Fraser operation.

By this time, however, much harm had already been dealt the cause of air power, the Air Force, and the aircraft industry itself, and a note of criticism began to

## "Let's Watch This One"

Under this title an editorial appeared on this page Dec. 21, 1950, following announcement of the Kaiser-Fraser contract.

"Kaiser-Fraser," said the editorial, "has been told that they can buy government approval for a cargo contract for building 100 child Packet cargo transports. That is an ironic accomplishment."

"No company in the aircraft industry has been able to depict this fact as ironic before."

"Mr. Kaiser's next figures have not yet seen the light of day, but we shall wait them with interest."

"Mr. Kaiser's short-lived experience in producing with Howard Hughes on the helicopter flying boat C-46, Kaiser had done very few. Therefore, to meet military production volume in comparison with the years of experience piled up by Fairchild Engine & Airplane Corp., Fairchild clearly is producing about eight Packets a month and could have increased this rate to 20 a month as the war heated. Mr. Kaiser's goal is 20 a month with the first step to be off the line late in 1954, but his lack of aircraft experience is again his greatest liability."

"A major company, known in the aircraft world, should have no price fight over doing with experience and know-how, surely because it happens to have won a large government loan. The nation's own defense is at stake. Quality and speed of aircraft are needed. Why risk both the government's money on a loan if you think it better spent on a high-cost defense manufacturer who may or may not make his schedule in an ever-changing world market?"

"Even there may come a time when everyone in the industry—and some who are now outside it—will be asked to the limit of their facilities to meet one national emergency schedule. But that time has not arrived yet. Ask any major aircraft company."

"We wish the testimony Kaiser is at the head, for the sake of the country. But this situation seems close enough."

The editorial received special comment in Washington. It was reprinted around by Edgar Kaiser, company president. It was reprinted in testimony given in his in San Diego subcommittee two and a half years later.

enter into the newspaper stories on the subject.

The Cleveland Plain Dealer, for example, pointed out that the KF "scandal" was embarrassing the so-called who were testifying for appropriations. "This is not a very good demonstration as to how to save money," said a Plain Dealer editorialist said, concluding that if there is in much waste and extravagance elsewhere in the Air Force budget in the previous Administration seems to have sponsored in this case, maybe it's a good thing to cut out the five billion dollars.

In the light of the KF record, despite the Truman Administration's second-sound philosophy, we cannot understand how the Air Force could have condoned for so long-up to June 5, 1953,—its original decision to order these aircraft from a firm inexperienced in aviation, when the established aircraft industry had facilities and know-how to do the job that was deemed necessary.

It is equally difficult to understand how the Air Force allowed the series of excessive increases in unit cost of KF aircraft to continue as long as it did. And apparently another increase is ahead.

It seems suggestive, in the interest of national defense and economy, that a logical termination date should be set at once on the KF cargo plane program, and a plant-out should be started at the earliest practical moment.

—Robert H. Wood

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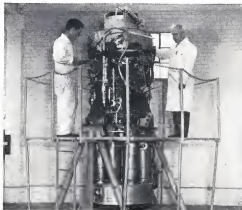
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